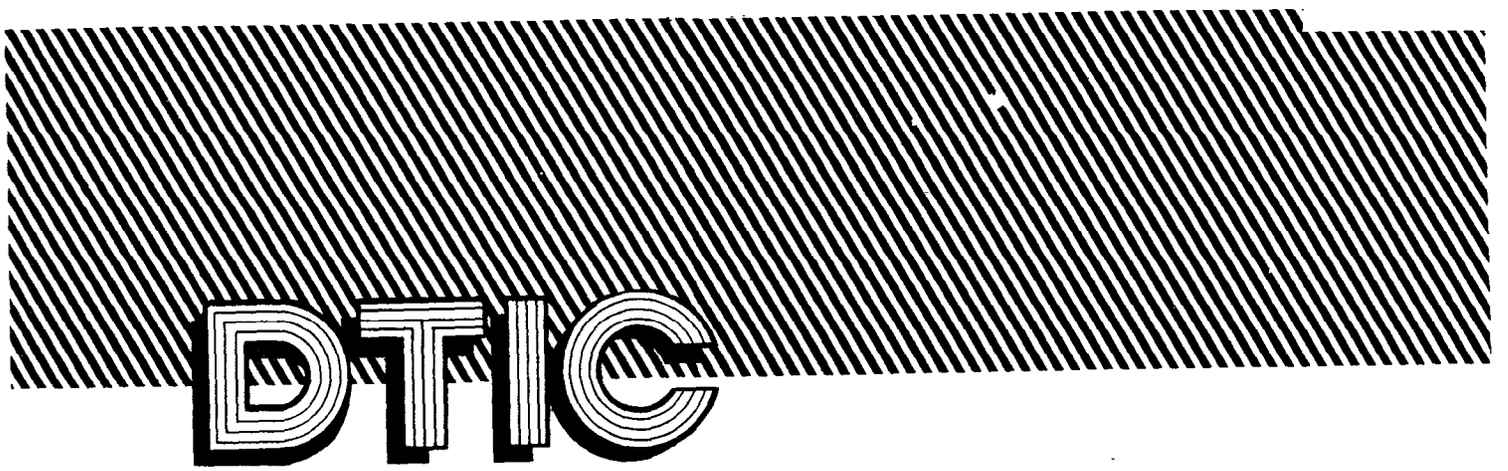

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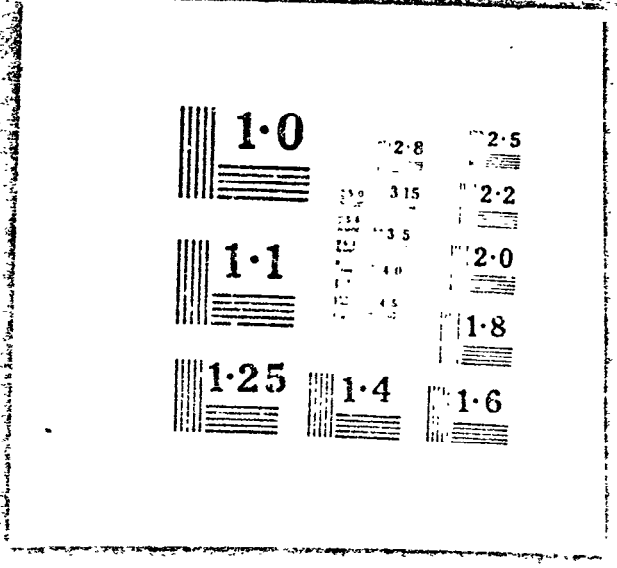

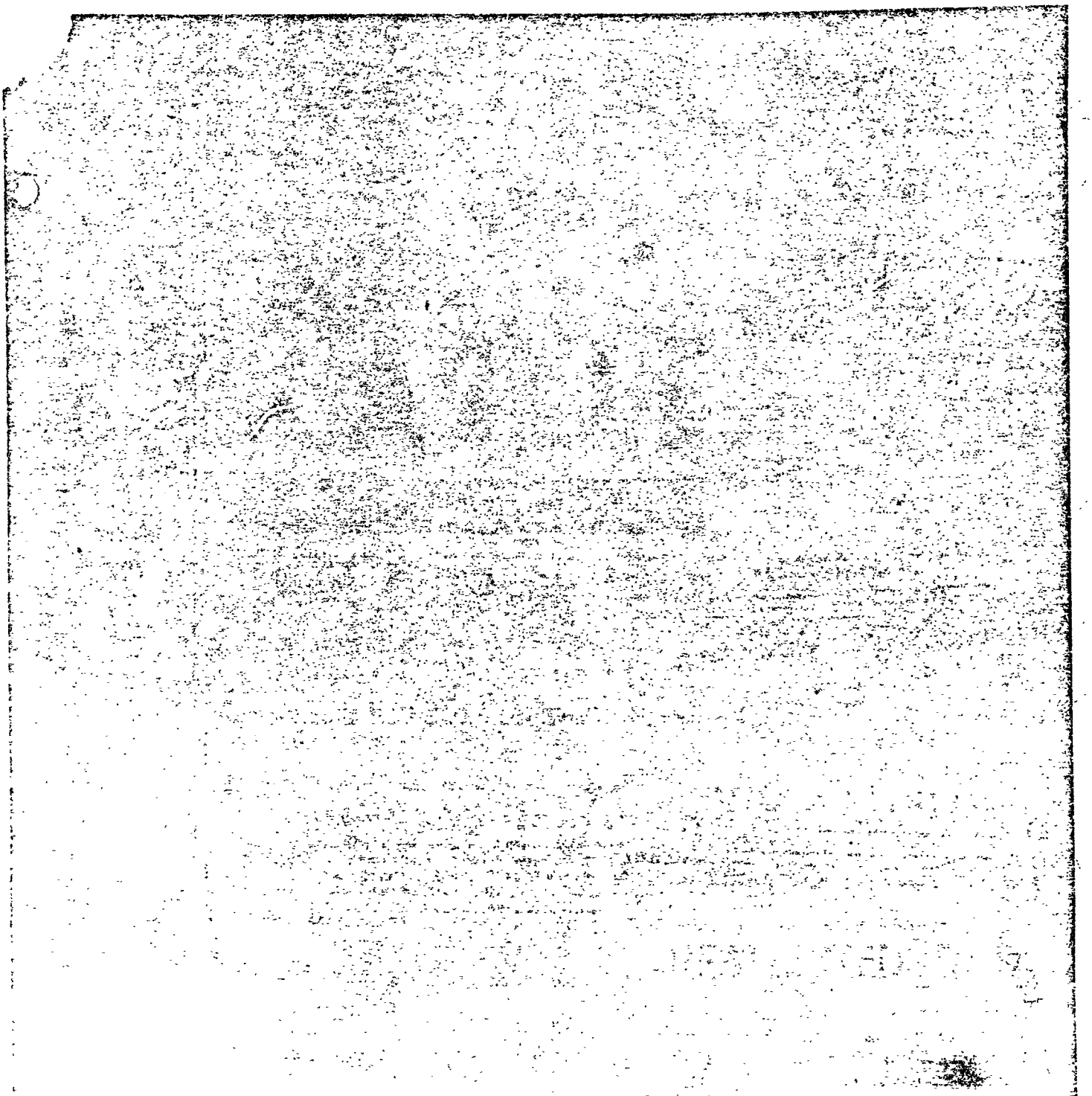

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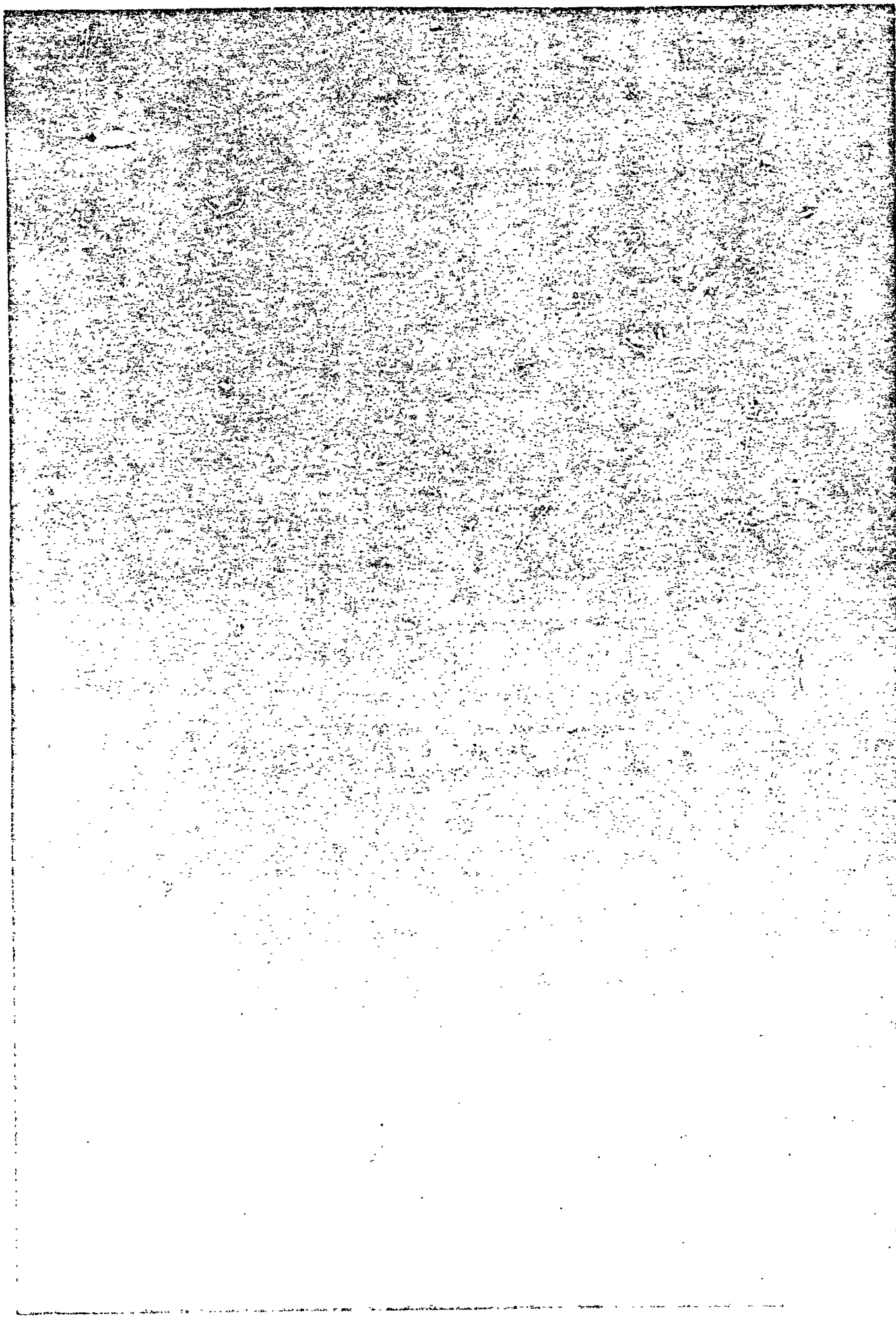


WT-921

This document consists of 48 pages

No. 214 of 220 copies, Series A

OPERATION CASTLE

Project 3.3

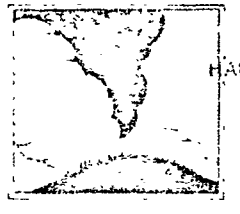
BLAST EFFECTS ON TREE STAND

REPORT TO THE TEST DIRECTOR

by

W. L. Fons
Theodore G. Storey

March 1955



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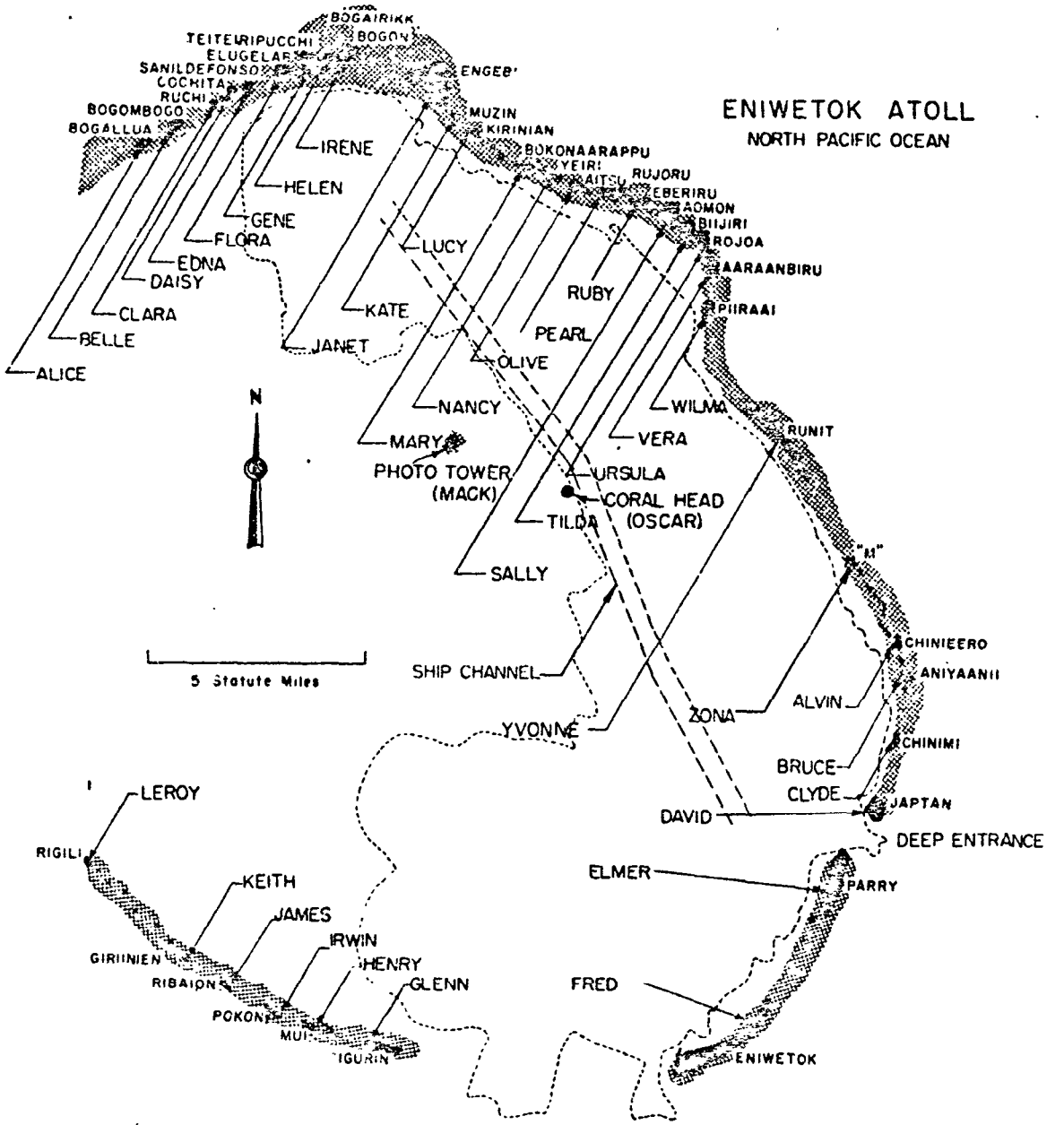
Forest Service
Division of Fire Research



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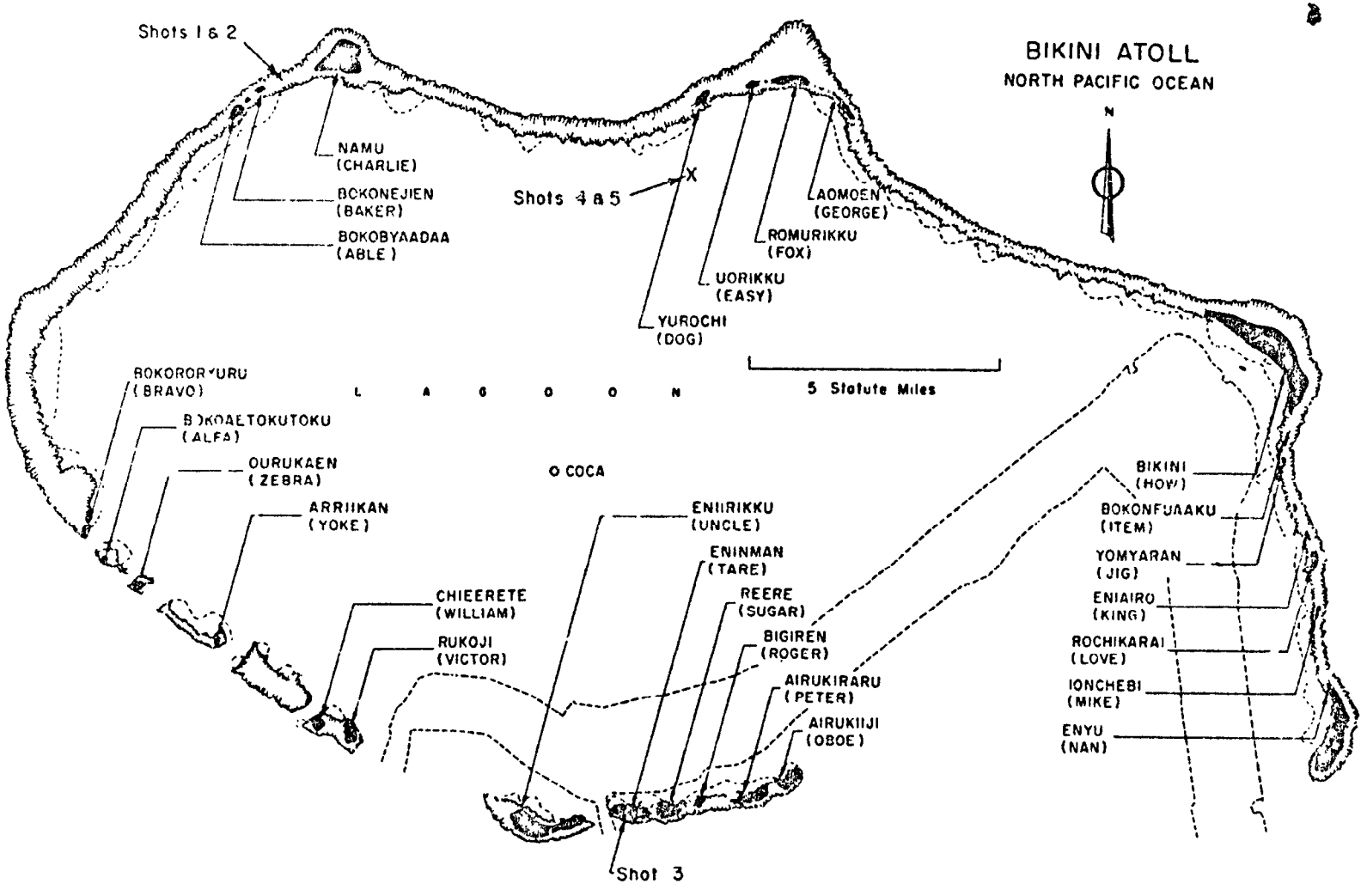

GENERAL SHOT INFORMATION

	Shot 1	Shot 2	Shot 3	Shot 4	Shot 5	Shot 6
DATE	1 March	27 March	7 April	26 April	5 May	14 May
CODE NAME (Unclassified)	Bravo	Romeo	Koon	Union	Yankee	Nectar
TIME*	06:40	06:25	06:15	06:05	06:05	06:15
LOCATION	Bikini, West of Charlie (Namu) on Reef	Bikini, Shot 1 Crater	Bikini, Tare (Eninman)	Bikini, on Barge at Intersection of Arcs with Radii of 6900' from Dog (Yurochi) and 3 Statute Miles from Fox (Aomoen)		Eniwetok, IVY Mike Crater, Flora (Elugelab)
TYPE	Land	Barge	Land	Barge	Barge	Barge
HOLMES & NARVER COORDINATES	N 170,617.17 E 76,163.98	N 170,635.05 E 75,950.46	N 100,154.50 E 109,799.00	N 161,698.83 E 116,800 27	N 161,424 43 E 116,688,15	N 147,750.00 E 67,790.00

* APPROXIMATE

ABSTRACT

Project 3.3 obtained experimental data on three natural tree stands in support of studies in predicting blast damage to forested areas. Primary objectives were: 1) to determine blast damage to trees in terms of stem breakage, limb breakage, and defoliation where effects are influenced by their location in a natural tree stand; 2) to determine the effect of natural forest cover on the shock wave in terms of its peak static overpressure and peak dynamic pressure attenuation; 3) to provide individual tree deflection data in the region of long positive phase duration times in order to support the theoretical basis for breakage prediction.

The tree stands on three separate islands varied from 29 to 170 acres in area with vegetation composed of broadleaf trees up to 80 ft tall and coconut palms about 40 ft tall. Several palms on the three islands were equipped with snubber wire arrangement for measuring maximum deflection. The large stand was instrumented with 16 self-recording ground-level static overpressure gages at eight locations and two self-recording dynamic pressure gages at two locations; the two smaller stands were instrumented with two static overpressure gages each. Sample plots were established on two islands for assessing stem and limb breakage in more detail.

Ground-level pressure measurements lengthwise of a large stand showed no attenuation in peak static overpressure. It was not possible to evaluate the degree of peak dynamic pressure attenuation because gages both in front of and inside the tree stand measured unrealistically high peak dynamic pressure compared to values calculated from corresponding peak static overpressure measurements. Nonuniform character of stands prohibited evaluation of shock attenuation from observations of tree damage with distance. The damage to the broadleaf trees was principally crown damage with occasional stem breakage or uprooting. The type of damage experienced was similar for moderate and high yield weapons. Observed damage from two weapons of different yields compare favorably with isodamage curves prepared for broadleaf stands.

FOREWORD

This report is one of the reports presenting the results of the 34 projects participating in the Military Effects Tests Program of Operation CASTLE, which included six test detonations. For readers interested in other pertinent test information, reference is made to WT-934, Summary Report of the Commander, Task Unit 13, Programs 1-9, Military Effects Program. This summary report includes the following information of possible general interest.

a. An over-all description of each detonation including yield, height of burst, ground zero location, time of detonation, ambient atmospheric conditions at detonation, etc., for the six shots.
b. Discussion of all project results.
c. A summary of each project, including objectives and results.
d. A complete listing of all reports covering the Military Effects Tests Program.

ACKNOWLEDGMENTS

Planning of Project 3.3 for Operation CASTLE was done by A. A. Brown, Division Chief, Fred M. Sauer, Theodore G. Storey, and W. L. Fons, Project Officer. Stenographic work during the planning of the project and in preparation of the report was performed by Flora M. Doyle.

The authors wish to acknowledge the assistance rendered by personnel of the Department of Defense, the Director of Program 3, and others at the Pacific Proving Grounds for their help to achieve the objectives of the project. Pressure measurements in the tree stands were made by Ballistic Research Laboratories. Preshot and postshot documentary still photography was made by Task Unit 8.

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TABLES

ILLUSTRATIONS

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CHAPTER 1

INTRODUCTION

1.1 OBJECTIVE

Project 3.3, Operation CASTLE, was part of a research program sponsored by the Armed Forces Special Weapons Project (AFSWP) aimed at prediction of blast damage to forested areas from atomic explosions. A knowledge of blast damage to forested areas provides a means of assessing the degree of damage to material and personnel and/or the amount of cover the forest affords. Degree of blowdown to the forest stand will also impede troop movements through or out of the area.

The objectives of this project were:

1. To determine blast damage to trees in terms of stem breakage, branch breakage, and defoliation where effects are influenced by their location in a natural tree stand.
2. To determine the effect of natural forest cover on the shock wave in terms of its peak static overpressure and peak dynamic pressure attenuation.
3. To provide individual tree breakage data in the region of long positive phase duration times in order to substantiate the basis for breakage predictions.

The degree of momentum exchange between the shock wave and obstacles, such as trees in a stand, capable of absorbing substantial amounts of energy is not well known. There is no immediate theoretical or scaled model method of analyzing the interaction of shock wave and trees in a natural tree stand; therefore it was necessary to achieve stated objectives experimentally.

CASTLE presented an opportunity to make measurements on a natural stand several times larger than the Operation UPSHOT-KNOTHOLE[1/] experimental stand. Even though the natural stand was composed of tropical trees, breakage data were desirable since continental tests in forested areas are not imminent.

1/ AFSWP, UPSHOT-KNOTHOLE, Project 3.19, Blast Damage to Coniferous Tree Stands by Atomic Explosions, WT-731, January 1954. CONFIDENTIAL--Restricted Data.

1.2 BACKGROUND

Previous analytical and experimental work[2,3] on isolated coniferous trees established that aerodynamic drag of tree crowns due to the action of particle velocity is a factor causing stem and branch breakage. The impulse given the tree crowns by the peak static overpressure is small since static pressure equalizes around individual components of the crown with the shock velocity. Structures having natural periods substantially longer than the time required for pressure equalization respond to the drag impulse of the dynamic pressure $1/2\rho u^2$ where ρ is the air density following the shock and u the particle velocity. The dynamic pressure pulse is characterized by its peak value, the positive phase duration, and the wave form factor.[4] Crown characteristics and drag measurements,[5,6] combined with breakage deflection and breakage force measurements,[7] resulted in an analytical prediction system for breakage of isolated trees. Breakage force-deflection measurements for static loading of ponderosa pines show that force and deflection at breakage vary approximately 300 per cent between the extremes.

On UPSHOT-KNOTHOLE an artificial stand of coniferous trees 320 ft long by 160 ft wide, composed of 145 ponderosa pine trees averaging 51 ft in height, was exposed at 4.5 psi peak static overpressure. The stand was instrumented along and across the stand with ground level static pressure gages and pitot-type dynamic pressure gages at three elevations 250 ft from front of stand. Ground-level pressure measurements showed no significant attenuation in peak static pressure or increase in rise times.

UPSHOT-KNOTHOLE results indicate that the prediction system for isolated trees was conservative when applied to small coniferous stands. However, in view of the unknown degree of attenuation for stands of large extent and the tenuous nature of the specification of military damage with respect to tree damage, isolated tree damage predictions were assumed representative of damage to tree stands. On the basis of analysis of all available data, a general breakage prediction system was developed which represents various levels of probability of breakage

2/ Operations Research Office, Preliminary Study of the Consequences of an Atomic Explosion Over a Forest, ORO-T-108, 1950, CONFIDENTIAL.
3/ AFSWP, SNAPPER, Project 3.3, Blast Damage to Trees--Isolated Conifers, WT-509, January, 1953, CONFIDENTIAL--Restricted Data.
4/ AFSWP, UPSHOT-KNOTHOLE, Project 3.19.
5/ U. S. Dept. of Agriculture, Forest Service, Div. of Fire Research, Experimental Investigation of Aerodynamic Drag in Tree Crowns Exposed to Steady Wind--Conifers, Phase Report for Operations Research Office, December, 1951, CONFIDENTIAL.
6/ U. S. Dept. of Agriculture, Forest Service, Div. of Fire Research, Crown Characteristics of Several Coniferous Tree Species, AFSWP Interim Tech. Report 416, February, 1955.
7/ U. S. Dept. of Agriculture, Forest Service, Div. of Fire Research, Tree Breakage Characteristics Under Static Loading, AFSWP Interim Tech. Report 406, January, 1953, CONFIDENTIAL.

for tree stands. The prediction system was applied to idealized tree stands to determine damage by various size weapons, using height of burst curves modified to include wave form and where damage criteria were based on length of stems down per acre. For three general stand types isodamage curves giving light and heavy damage have been prepared for inclusion in the Capabilities Handbook.[8]

8/ AFSWP, Capabilities of Atomic Weapons, TM 23-200, October, 1952, SECRET.

CHAPTER 2

EXPERIMENT DESIGN

2.1 GENERAL

The experiment design consisted of sample plots and pressure measurements on three small naturally forested islands (Uncle, Victor, and William) spaced along a radius bearing approximately 280° from Shot 3. These islands spanned a desirable predicted overpressure region for the expected yield ranging from heavy damage to light or no damage. It was essential to the success of the experiment that a substantial portion of the trees as a group remain intact, giving a graded series of damage in order to secure data in substantiation of previously developed breakage prediction systems.1/

The size of the stands and the range covered were dictated by the adequacy of vegetation and the radial, periodic orientation of the few available islands adjacent to Shot 3 island. Because of expected contamination by Shots 1 and 2 all project work for Shot 3 on the three islands except arming of the various gages was completed prior to Shot 1.

2.2 TREE STANDS

2.2.1 Uncle Island

Uncle Island, largest of the three islands, west of the tidal inlet is 170 acres in area, and bore a dense cover consisting of coconut palm, Pisonia (a broadleaf tree), and several shrub species. Openings among the trees were covered with the grass Lepturus and the prostrate Ipomoea vine while the fringing trees were adorned with the liane-type vine Cassytha. Table 2.1 gives common and botanical names of the important tree and shrub species on all islands and their relative abundance. Figure 2.1 shows the Uncle Island stand from the air prior to Shot 1. Figure 3.5 is a view inside the palm portion of the same stand, and Fig. 3.4 shows the interior of the broadleaf portion of Uncle Island stand.

1/ AFSWP, UPSHOT-KNOTHOLE, Project 3.19.

TABLE 2.1 - Principal Stand Components on Uncle, Victor, and William Islands

Common Name	Botanical Name	Growth Form	Abundance		
			Uncle Island (%)	Victor Island (%)	William Island (%)
Pisonia	Pisonia grandis R. Brown	large tree	40.0	70.0	20.0
Coconut palm	Cocos nucifera Linn.	large tree	20.0	0.1	5.0
Scaevola	Scaevola frutescens Mill.	large shrub	20.0	20.0	35.0
Tournefortia	Tournefortia argentea Linn.	lg. shrub or small tree	10.0	5.0	15.0
Guettarda	Guettarda speciosa Linn.	lg. shrub or small tree	5.0	3.0	15.0
Cordia	Cordia subcordata Lam.	small tree	3.0	1.3	7.0
Pandanus	Pandanus sp.	medium size tree	1.0	0.5	1.0
Pemphis	Pemphis acidula For.	lg. shrub or small tree	1.0	0.1	2.0
		Total	100.0	100.0	100.0

Taller, dominant coconut palms, averaging 45 ft in height and 14 in. in diameter at 5 ft above ground, fringed the central lagoon side of the island to a depth of about 800 ft. Several brush species composed a dense understory of a uniform 20 ft height that extended over the remainder of the island, broken only on the east and west ends by taller clumps of the broadleaf Pisonia averaging 50 ft in height and 24 in. in diameter at the base. Figure 2.2 shows the location of the principal Uncle stand components and their relation to ground zero.

Excluding the somewhat heavier tropical undergrowth found on Uncle Island, the Pisonia clumps bore a marked resemblance to an American beech forest by the deliquescent branching and leaf size. Also superficial examination showed the root systems to be similar. With on-the-ground study it became increasingly apparent that this similarity to the beech forest would make the Pisonia portions of the stands the most useful for verification of breakage prediction system developed.

Palm, on the other hand, a monocotyledon, is unlike either the coniferous or broadleaf trees (both dicotyledons) that comprise the bulk of the earth's sizable temperate vegetation. The stem of palm does not exhibit the characteristic ring-type growth but has a hard outer

Fig. 2.1 Aerial View of Uncle Island Prior to Shot 1, Looking Away from Ground Zero. Victor and William Islands in distance.

shell becoming softer toward the center. In addition the concentration of the pliable crown at the apex of the single stem is unique as is the extensive, fibrous root system emanating from the swollen lower stem. Two other factors, unrelated to the structure of the tree or to inherent wood strength but which rendered most palm trees on these three islands unsuitable for study, were axe damage and fire scar. Nearly all trees bore some foothold notches and the cross sectional areas of many were seriously reduced, predisposing such trees to breakage. Fire damage to root crowns from past ground fires had reduced the bearing surface of many palms, again predisposing them to breakage at the ground line. All palms studied were carefully selected and were relatively free of these defects.

Topography was uniformly flat with a maximum elevation of 12 ft above mean low water springs. Nowhere was topography sufficient to cause shielding of pressure gages.

2.2.2 Victor Island

The uncleared portion of Victor Island, 36 acres in area, was covered with a dense, nearly pure stand of large Pisonia trees. From a fringe of pioneer Tournefortia and Scaevola scrub along the top of the beach the trees increased in height to the center of the island. This effect, known as "wind shear" or "spray shear," was most pronounced from north to south, the direction of the prevailing wind. Over the years the mechanical breakage action of hurricane winds and the growth-retarding effect of impinging salt had imparted this domed appearance to the

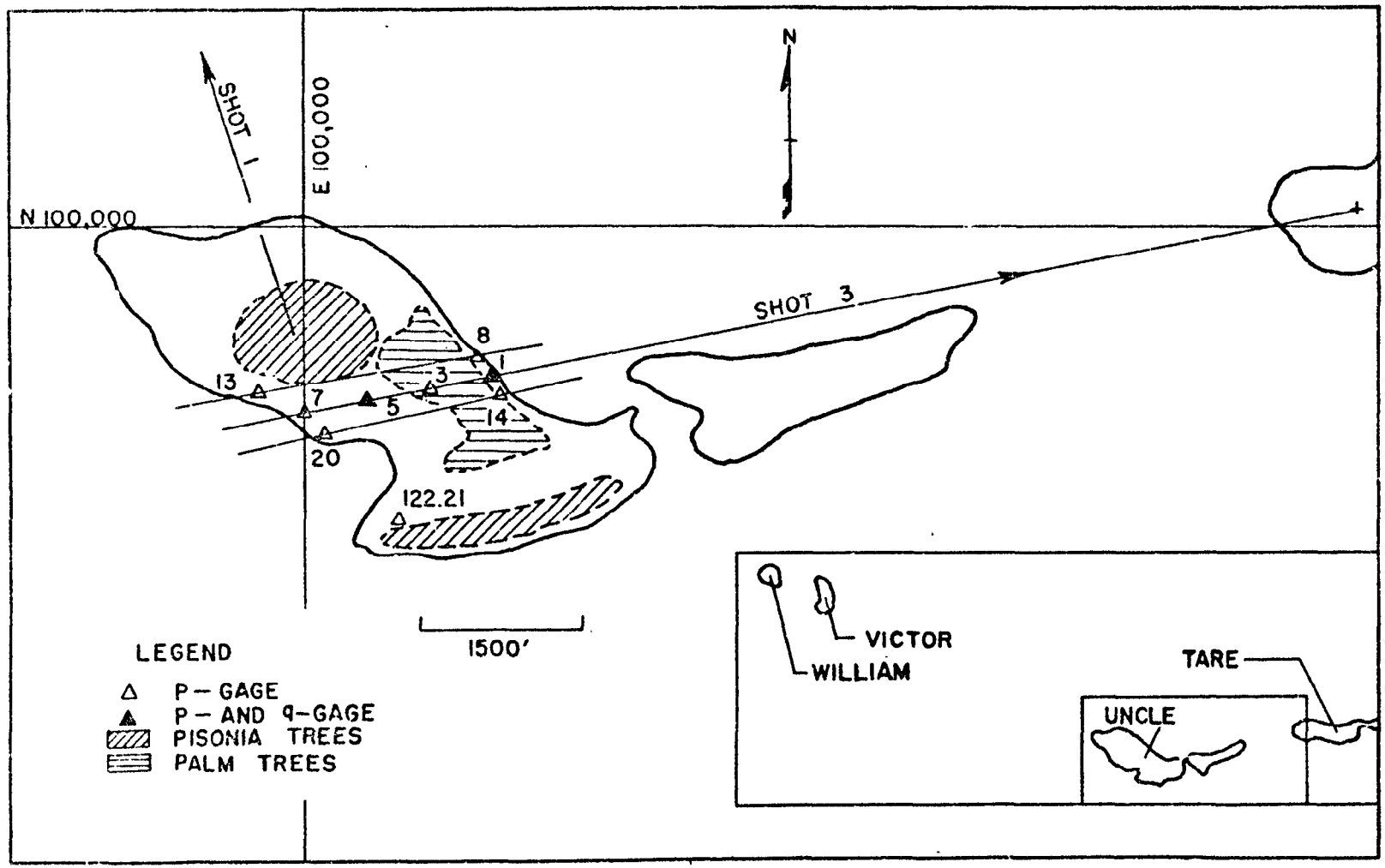

Fig. 2.2 Uncle Island Showing Orientation, Pressure Gage Locations, and Principal Stand Components

stand that centered on the southern third of the island. Trees in the main portion of the stand averaged 80 ft in height, with many individual specime s up to 42 in. in diameter at 5 ft above ground. The shorter trees to w[illegible]rd of the stand center were thicker for their height and therefore stronger. Branches were thick and short with gnarled ends.

Undergrowth was quite scanty in the stand center due to the deep shade cast by the crowns of the close-growing trees. Underbrush increased toward the beach on all sides as shading decreased. Although Pisonia as well as all other species are evergreens, there is considerable leaf fall in the dry season. CASTLE fell in this period, and no doubt foliage was somewhat deficient although there was full shading in the stand center. Figure 2.3 shows the orientation of the stand on Victor with respect to the other two islands and Tare. An exterior view of the Pisonia stand on the southern third of Victor prior to Shot 1 is shown in Fig. 2.4, and Fig. 3.2 gives the interior stand appearance.

Topography was uniformly flat above the beach slope, reaching a maximum elevation of only 10 ft.

2.2.3 William Island

William Island, 29 acres in area, supported a uniformly dense cover of low broadleaf brush species broken only by a small colony of palm trees on the southern tip and a 5 acre stand of large Pisonia in the center of the island. The palms averaged 40 ft tall and 13 in. in diameter, while the Pisonia averaged 50 ft in height with trees up to 24 in. diameter at breast height (d.b.h.). The Pisonia stand exterior view closely resembled the Victor Island stand shown in Fig. 2.4 although trees were not quite as tall. An aerial view of William Island is presented in Fig. 2.5. Figure 2.3 gives the orientation of the stand components and their relation to ground zero. The interior stand appearance is shown in Fig. 3.1.

2.3 INSTRUMENTATION

To assess the effects of the Uncle Island stand on shock overpressure, both static and dynamic, in terms of horizontal attenuation the stand was instrumented at eight locations with twin ground-level static pressure gages and at two locations with single dynamic pressure gages at 3 ft elevation (see Fig. 2.2 for locations). Twin static pressure gage installations were also made in the cleared areas of Victor and William Islands, and a dynamic pressure gage, at 3 ft elevation, was placed on Victor Island (see Fig. 2.3 for locations). Table 3.1 gives ground ranges for all pressure gages. Gage installations and pressure measurements were provided by the Ballistic Research Laboratories (BRL), Project 1.2b,[2/] which also had pressure gage installations along a radial blast line cleared of vegetation adjacent to the Uncle Island tree stand (Fig. 2.1).

2/ Ground Surface Air Pressure vs Distance from High Yield Detonations, Operation CASTLE, Project 1.2b, WT-905.

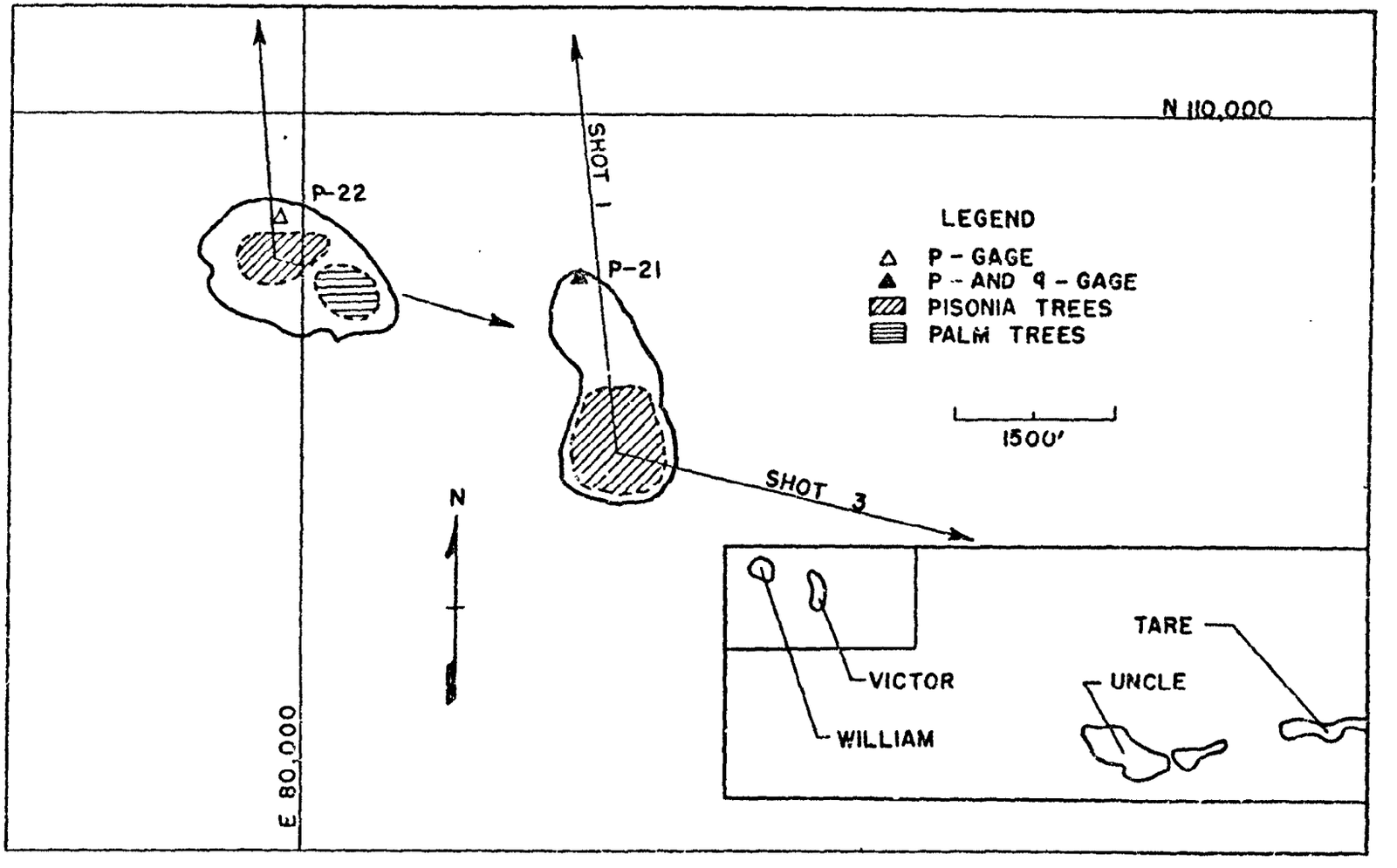

Fig. 2.3 Victor and William Islands Showing Orientation, Pressure Gage Locations, and Principal Stand Components

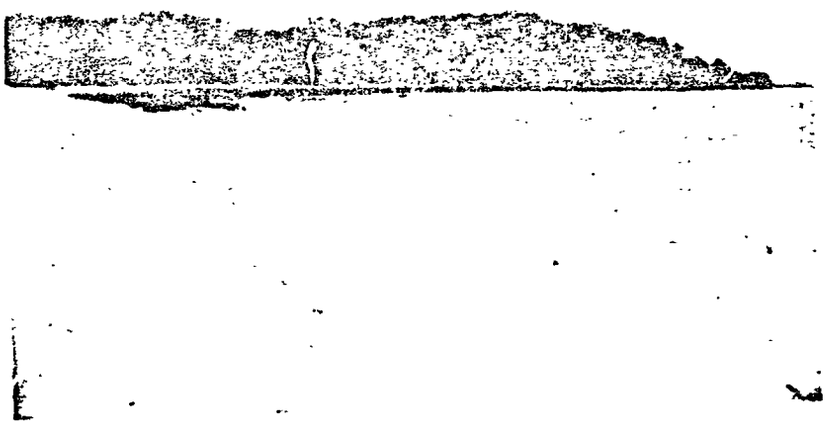

Fig. 2.4 Exterior View of Pisonia Stand on Southern Third of Victor Island Prior to Shot 1

Fig. 2.5 Aerial View of William Island Stand Prior to Shot 1 Looking Away from Shot 3 Ground Zero

Sound palm trees of various heights were selected across Uncle Island stand, and were provided with a snubber wire arrangement to measure maximum deflection of the center of pressure of the tree crowns under shock loading. Similar snubber wires were installed on palm trees on Victor and William Islands. Snubber wire arrangement consisted of two lengths of piano wire attached to the tree at the center of pressure of the tree crown and led down through friction grips on stakes driven into the ground, each a different known distance from the base of the tree on a radius toward ground zero. Sufficient tail was provided each, and measurements pre- and post-Shot 1 permitted calculations of the maximum movement of centers of pressure under shock loading.

2.4 SAMPLE PLOTS

To assess damage in detail to tree stands from shock-wave winds accompanying Shot 3 in terms of stem and branch breakage and defoliation, and to demonstrate how damage to individual trees is influenced by their location in the stand, sample plots were established on Uncle and Victor Islands. Plots were photographed and tree characteristics were measured prior to Shot 1.

On Uncle Island one Pisonia and three palm sample plots were selected along a radius spanning the center of the island. Sample plots for tree measurement were about 1/5-acre in area and contained from six to eight large trees with an understory of brush. Sample plot tree data are presented in Table 3.3. Figure 3.4 gives the pre-Shot 1 appearance of the Uncle Island Pisonia sample plot looking away from ground zero.

Only one sample plot was studied in the pure Pisonia stand on Victor Island as the island was considered too narrow to detect differences in individual tree breakage with position in the stand. A 100 per cent cruise of the trees on this 1/4-acre plot was made recording diameters and heights. These data are given in Table 3.2. A ground photograph of the sample plot taken prior to Shot 1 is presented in Fig. 3.2.

2.5 STATIC BREAKAGE TESTS

2.5.1 Field Tests

Prior to Shot 1 static bending tests similar to those conducted for ponderosa pine[3/] were applied to 10 naturally rooted coconut palms in the Uncle Island stand to determine the force and deflection necessary for breakage. Static deflection measurements were necessary for calculating predicted deflection for breakage.

Table 2.2 gives physical characteristics and static breakage data for all test specimens. Palms on the three test islands were considered one population for application of bending strength test data.

2.5.2 Standard Tests

As the standard strength parameters for green palm and Pisonia wood had not been determined previously, arrangements were made for

3/ U. S. Dept. of Agriculture, Forest Service, Div. of Fire Research, Tree Breakage Characteristics Under Static Loading.

TABLE 2.2 - Experimental Stem Breakage Data for Palm Trees on Uncle Island [a]

Tree No.	H_b (ft)	d_b [b] (in.)	H_r (ft)	d_r [b] (in.)	H_c (ft)	d_c [b] (in.)	H_{br} (ft)	τ_t (sec)	τ_s (sec)	W_{dc} (lb)	R_b (lb)	y_b (ft)
1	40.7	11.0	33.7	6.6	35.7	6.6	7.5	2.47	1.18	68	1,658	30.1
2	41.5	12.5	35.0	6.8	38.5	5.9	0.0	--	1.34	80	2,677	33.0
3	35.5	12.0	27.7	7.2	30.5	6.5	0.8	1.76	0.90	71	960	5.7
4	39.0	10.5	31.0	7.7	34.0	7.1	8.0	2.39	--	102	3,040	20.6
5	48.0	17.2	39.0	8.9	43.0	8.4	15.3	2.61	0.94	108	4,496	18.9
6	32.5	12.5	21.5	9.0	25.5	8.8	0.0	1.78	0.50	108	4,148	12.3
7	33.5	10.7	26.5	6.4	30.5	6.2	9.5	1.78	0.75	86	2,340	19.6
8	30.5	11.2	24.5	8.2	27.5	7.8	0.0	1.97	0.61	96	1,891	11.2
9	48.5	11.6	40.0	6.8	43.5	6.4	0.5	2.27	1.35	77	1,342	18.0
10	25.8	10.8	18.3	7.2	20.8	7.8	5.0	1.35	0.50	80	2,582	12.2

[a] For Nomenclature see page 46.
[b] Coconut palm has no bark.

static bending tests at the proving grounds. Following ASTM standards small clears were cut and subjected to tests in the materials testing laboratory on Elmer Island (Eniwetok Atoll). From force-deflection data, strength characteristics were calculated.

Table 2.3 presents average values of fiber stress at proportional limit, modulus of rupture, and modulus of elasticity for the three palm and Pisonia test specimens. Similar values for typical American woods are given for comparison purposes.

2.6 PHOTOGRAPHY

To fix the undamaged appearance of sample plots, snubber trees, and the tree stands as a whole, extensive still ground photography was made prior to Shot 1. Low oblique aerial photographs were taken at intervals along the center pressure gage radial across Uncle Island stand. These views when repeated post-Shot 3 allowed assessing damage in terms of stem and branch breakage and defoliation, and the effect of tree position in the stand.

TABLE 2.3 - Comparative Strength Properties of Palm and Pisonia with Typical American Woods

Common and Botanical Name of Species	Moisture (%)	Specific Gravity	Fiber Stress at Proportional Limit (lb/sq in.)	Modulus of Rupture (lb/sq in.)	Modulus of Elasticity (10^3 lb/sq in.)
Coconut palm [a] (Cocos nucifera)	209	.35	1,800	3,600	370
Pisonia [a] (Pisonia grandis)	243	.25	1,700	2,300	305
American beech [b] (Fagus grandifolia)	54	.56	4,300	8,600	1,380
Douglas-fir [b] (Pseudotsuga taxifolia)	36	.45	4,800	7,600	1,550
Ponderosa pine [b] (Pinus ponderosa)	91	.38	3,100	5,000	970
Silver maple [b] (Acer saccharinum)	66	.44	3,100	5,800	940

[a] Average of three specimens.
[b] Wood Handbook, Forest Products Laboratory, Forest Service, USDA. June, 1940.

CHAPTER 3

RESULTS

3.1 GENERAL

The unexpectedly large yield of Shot 1 incident from the opposite direction of Shot 3 caused heavy damage to the tree stands on William and Victor Islands, and light damage to the upper portion of the stand on Uncle Island. Shot 2, coming from the same direction as Shot 1, caused no additional damage.

Shot 1 proved to be rather fortuitous, especially in light of the unexpectedly low yield of Shot 3, for which heavy damage extended to just beyond the light damage region of Shot 1. Thus, two sets of graded general damage data were secured instead of one, namely, data on damage from a high yield weapon of long positive phase duration time, and damage from a medium yield weapon with shorter positive phase duration time.

3.2 OVERPRESSURE AND POSITIVE PHASE DURATION

3.2.1 Shot 1

Ground ranges and estimates of overpressures and positive phase duration for Shot 1 are given in Table 3.1. Ground ranges were calculated from established coordinates, and are distances to BRL gages used for reference points. Free field overpressure and positive phase duration time data were furnished by Program 1[1/] and were used in correlating damage with distance of natural tree stands.

3.2.2 Shot 3

Table 3.1 gives ground ranges and overpressure and positive phase duration time estimates used in reducing test data. Peak static overpressure records from Shot 3 were satisfactory as generally one gage in each twin installation was operative. Positive phase duration time data

1/ Summary Report of the Commander Task Unit 13, Operation CASTLE Programs 1-9, WT-934. SECRET--Restricted Data.

TABLE 3.1 - Pressures and Positive Phase Duration Times at Project 3.3 Stations, Shots 1 and 3

Station Number [a]	Ground Range (ft)	Peak Static Overpressure (psi)	Positive Phase Duration (sec)	Peak Dynamic Pressure (psi)
		Shot 1		
P-22	61,710	2.5 [b]	10.0 [b]	--
P-21	62,500	2.4 [b]	10.0 [b]	--
P-13	75,400	1.7 [b]	12.0 [b]	--
		Shot 3		
P-14	8,040	4.70 [c]	1.46 [c]	--
P-1	8,200	4.50	1.16	0.9
P-8	8,340	4.52	1.47	--
P-3	8,800	NR [d]	--	--
122.21 [e]	9,380	4.12	1.61	--
P-5	9,400	4.19 [f]	--	2.3
P-20	9,840	3.98	--	--
P-7	10,000	4.07	--	--
P-13	10,440	3.20	--	--
P-21	28,430	0.79 [f]	--	0.5
P-22	31,310	--	--	--

[a] See Figs. 2.2 and 2.3 for gage locations.
[b] Values furnished by Program 1, gages not activated.
[c] Average of two gages.
[d] No record obtained.
[e] BRL free field measurements, adjacent to tree stand. Average of 5 gages.
[f] From dynamic pressure gage.

were incomplete. All dynamic pressure gages were operable and records were satisfactory. A peak static overpressure measurement taken in the cleared area of BRL gage line on Uncle Island, which was at a ground range about equal to the center of the tree stand, is given for comparison with measurements taken within the stand.

3.3 MAXIMUM DEFLECTION MEASUREMENTS

Shot 3 maximum deflection data from snubber trees on Uncle Island were unsatisfactory due to breakage of instrumented trees or fouling of wires by falling trees and branches. Deflections of instrumented trees on Victor and William Islands were negligible although all snubbers were operative.

As no usable deflection data were obtained the physical characteristics of snubber trees are not reported.

3.4 SHOT 1 DAMAGE

The William Island Pisonia stand near Station P-22 at a ground range of 61,710 ft, 2.5 psi peak static overpressure, was heavily damaged. Before and after interior views of the stand are given in Fig. 3.1. Damage was primarily in the form of branch breakage with some uprooting and main stem breakage. All uprooted trees fell away from ground zero. All broadleaf species were completely defoliated. Only two defective palms were broken, others suffered only occasional loss of fronds.

The Victor Island Pisonia stand near Station P-21, including the sample plot, at a ground range of 61,500 ft, 2.4 psi peak overpressure, were heavily damaged. Figure 3.2 shows the plot interior before and after Shot 1. Figure 3.3 gives an exterior postshot view for comparison with preshot view shown in Fig. 2.4. Damage was quite similar in appearance to that on William Island as the two small islands were practically contiguous. Table 3.2 presents number, size, and damage distribution for the trees on the sample 1/4-acre plot.

There was 30 per cent branch breakage, considered as light damage, in the Pisonia clump on the northwest end of Uncle Island near Station P-13 at 75,400 ft ground range, 1.7 psi peak static overpressure, and 12 sec positive phase duration time. Damage also was primarily in the form of branch breakage and heavy defoliation with occasional trunk failure and uprooting of smaller trees. Figure 3.4 shows the Uncle Island Pisonia sample plot before and after Shot 1.

3.5 SHOT 3 DAMAGE

Physical characteristics of trees on the four Uncle Island sample plots and corresponding breakage data are presented in Table 3.3. Fifteen of the 26 trees in the 4 plots or 58 per cent were damaged at an average ground range of 8800 ft, 4.2 psi peak static overpressure. This degree of damage is borne out by the appearance of the stand as a whole and was considered heavy damage.

Fig. 3.1 William Island Pisonia Stand Near Station P-22, Before and After Shot 1, Looking Away from Ground Zero.
Ground Range, Station P-22: 61,710 ft
Peak Static Overpressure: 2.5 psi

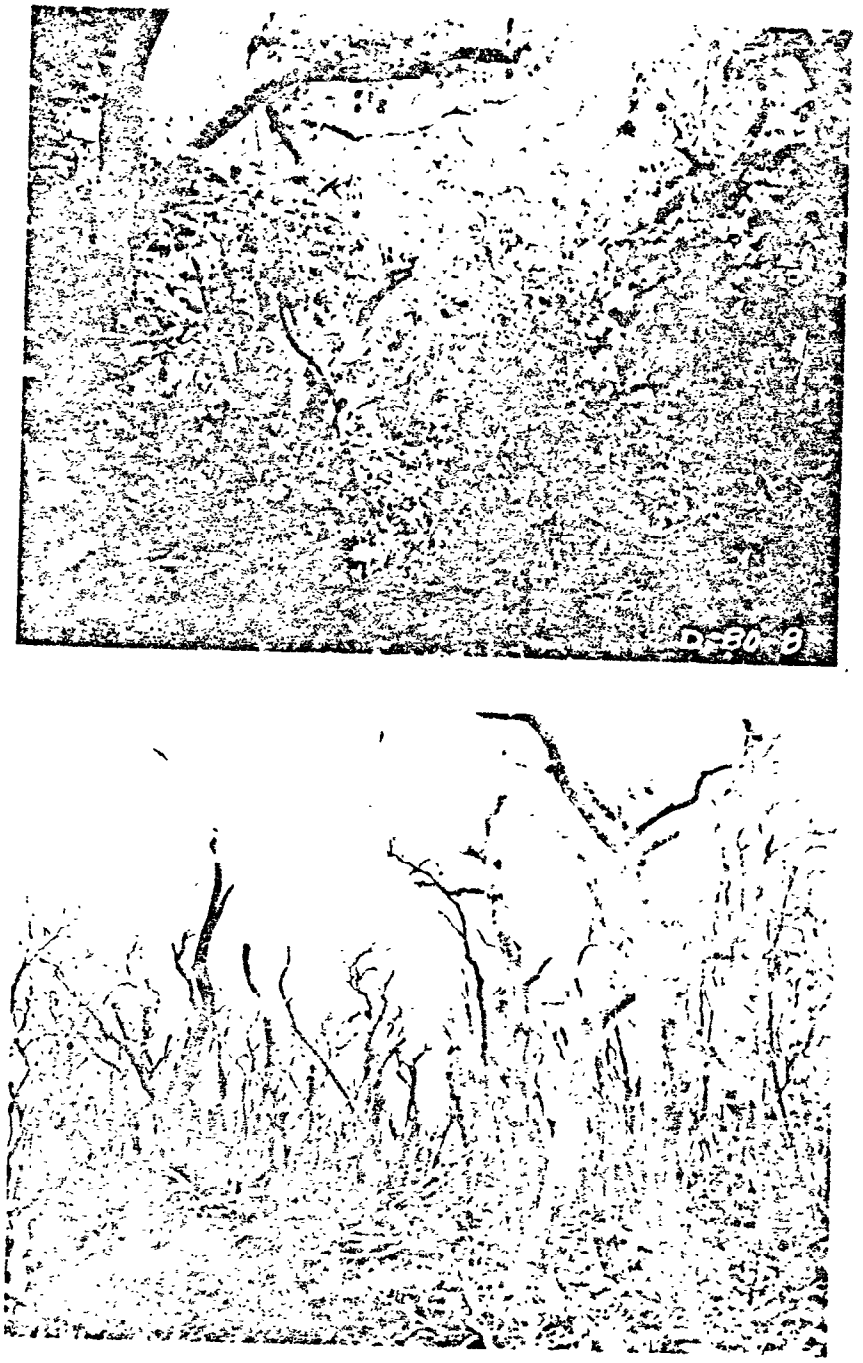

Fig. 3.2 Victor Island Pisonia Stand Near Station P-21, Before and After Shot 1, Looking Away from Ground Zero.
Ground Range, Station P-21: 62,500 ft
Peak Static Overpressure: 2.4 psi

Fig. 3.3 Exterior View of Pisonia Stand on Southern Third of Victor Island Near Station P-21, Following Shot 1, at Right Angles to Blast Line, With Ground Zero to Left. (Preshot view, Fig. 2.4.)
Ground Range, Station P-21: 62,500 ft
Peak Static Overpressure: 2.4 psi

Figures 3.5 and 3.6 show the appearance of the palm portion of Uncle Island tree stand prior to and following Shot 3 at 8340 ft and 8600 ft ground rarges. respectively. Figure 3.5 shows the nearly complete destruction of smaller broadleaf species and light damage to the palm. Figures 3.7 and 3.8 at successively greater distances show damage in the predominantly broadleaf portion of Uncle Island stand.

Damage to Pisonia trees was primarily in the form of branch breakage and complete defoliation with some uprooting and main stem failure. Figure 3.9, which repeats Fig. 3.4, shows additional damage to the Pisonia sample plot resulting from Shot 3.

No additional damage resulted to either Victor Island or William Island tree stands from Shot 3.

TABLE 3.2 - Tree Characteristics and Damage, Shot 1--Victor Island 1/4-acre Pisonia Sample Plot [a]

Diameter Class (in.)	Average Height (ft)	Total Trees in Sample Plot (no.)	Trees with Crown Damage (no.)	Trees Uprooted (no.)	Tree Damage by Diameter Class (%)
4	23	3	2	0	66
6	25	5	3	0	60
8	40	3	3	0	100
10	37	5	4	1	100
12	40	1	1	0	100
14	48	3	3	0	100
16	48	2	0	1	50
18	75	3	0	1	33
20	68	2	0	0	0
22	64	5	1	0	20
24	70	8	4	1	62
26	70	3	2	0	66
28	75	3	2	0	66
32 [b]	75	2	0	0	0
48	80	1	1	0	100
Total		49	28	4	65.2

[a] Estimated peak static overpressure of 2.4 psi at sample plot.
[b] No trees in 30 in. or 34 to 46 in. class.

Fig. 3.4 Uncle Island Pisonia Sample Plot D Near Station P-13, Before and After Shot 1, Looking Toward Ground Zero.
Ground Range, Station P-13: 75,400 ft
Peak Static Overpressure: 1.7 psi

TABLE 3.3 - Tree Characteristics and Damage, Shot 3--
Uncle Island Sample Plots

Plot [a] and Tree No.	Ground Range (ft)	Stem Diameter at Base [b] (in.)	Total Height (ft)	Crown Height (ft)	Period (sec)	Height of Break (ft)
A-1	8,340	11.4	31	14	1.64	0
A-2	"	17.6	59	10	3.00	8
A-3	"	12.7	52	12	2.51	-- [d]
A-4	"	14.1	57	12	3.09	6
A-5	"	13.7	42	12	2.18	10
A-6	"	12.5	52	10	2.55	-- [d]
A-7	"	14.1	51	12	2.60	9
B-1	8,610	11.4	27	10	1.34	-- [d]
B-2	"	12.7	25	10	1.90	-- [d]
B-3	"	14.3	32	12	2.18	-- [d]
B-4	"	11.3	43	10	2.52	-- [d]
B-5	"	14.1	44	10	2.74	-- [d]
B-6	"	12.0	36	10	2.17	-- [d]
B-7	"	11.2	39	10	2.67	-- [d]
B-8	"	10.7	36	10	2.29	5
C-1	9,000	13.2	34	10	1.98	4 [e]
C-2	"	13.0	36	10	1.96	16
C-3	"	12.6	38	10	2.32	21
C-4	"	12.2	38	10	2.58	-- [d]
C-5	"	14.5	32	12	1.58	-- [d]
C-6	"	13.1	48	12	1.75	28
D-1 [c]	10,140	10.6	35	10	2.22	20
D-2	"	11.0	40	15	2.42	0
D-3	"	13.9	45	20	2.00	-- [f]
D-4	"	15.2	40	15	1.92	-- [f]
D-5	"	12.3	42	17	2.14	-- [f]
D-6	"	10.6	35	10	2.48	-- [f]

[a] Plots A, B, and C, coconut palm; Plot D, Pisonia.
[b] Diameter at 5 ft above ground level.
[c] On Plot D some defoliation and small branch breakage resulted from Shot 1.
[d] No damage.
[e] Broken by Shot 1.
[f] Branch breakage.

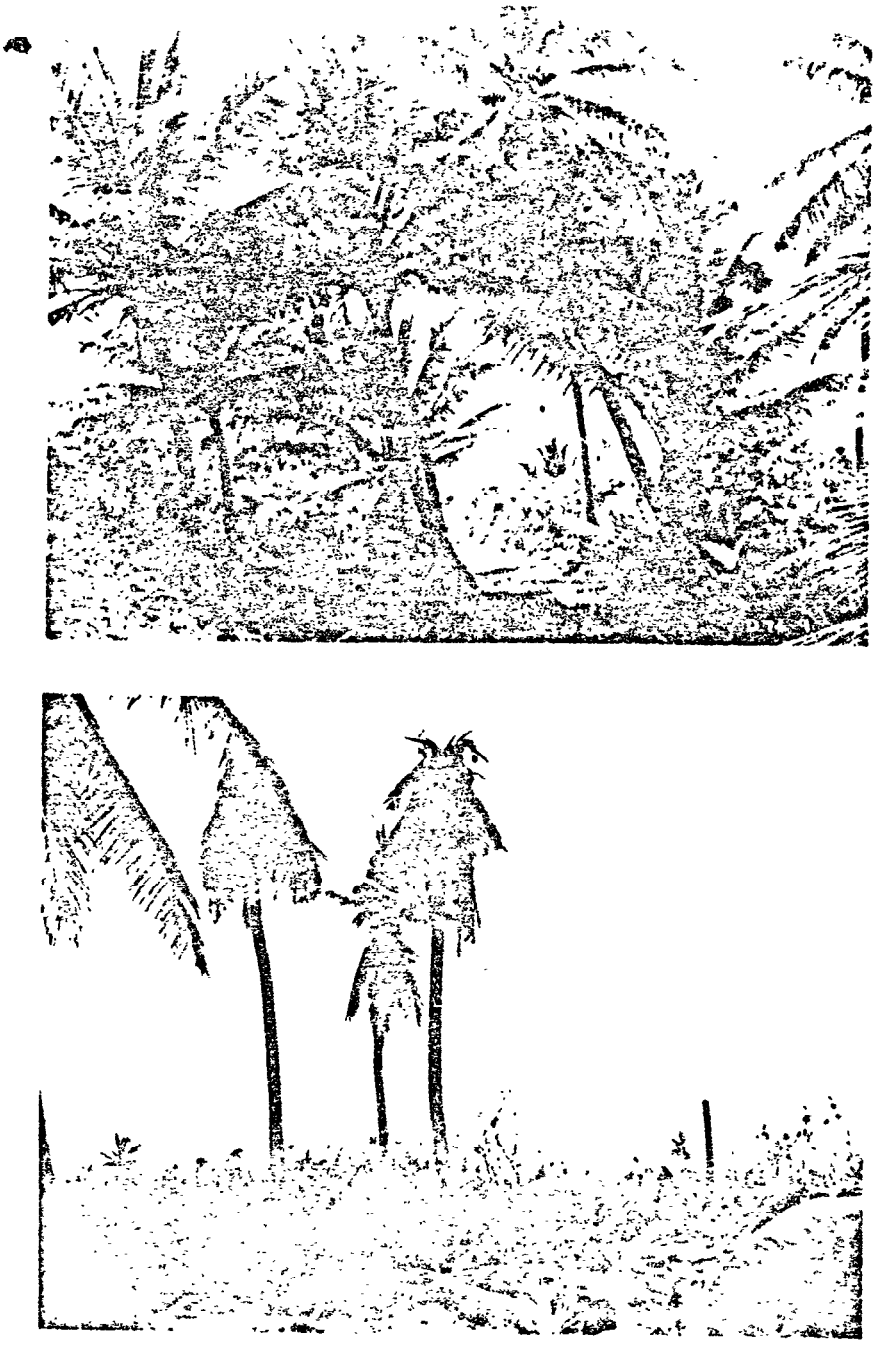

Fig. 3.6 Uncle Island Palm Sample Plot B, Before and After Shot 3.

Ground Range:	8610 ft
Peak Static Overpressure (from Fig. 4.1):	4.4 psi

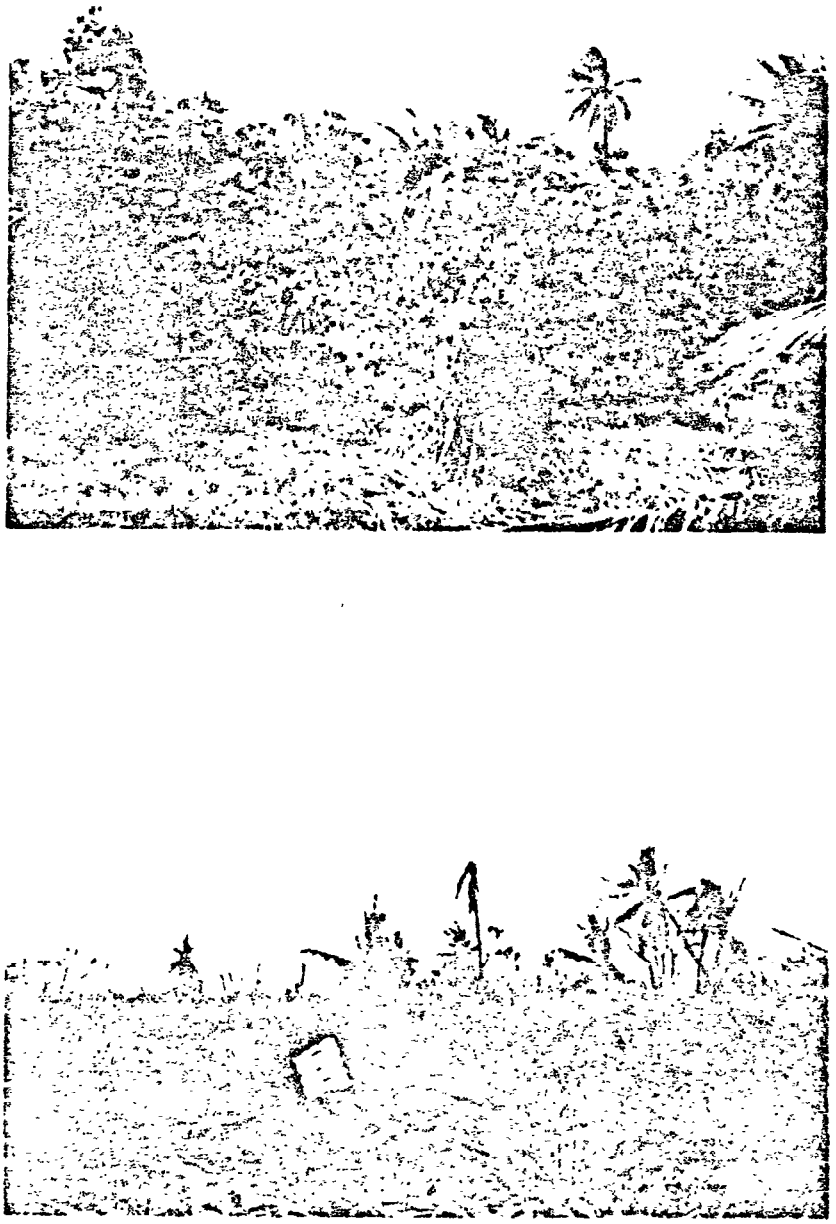

Fig. 3.7 Uncle Island Tree Stand, Before and After Shot 3, Looking Away from Ground Zero.
Ground Range: 8800 ft
Peak Static Overpressure (from Fig. 4.1): 4.2 psi

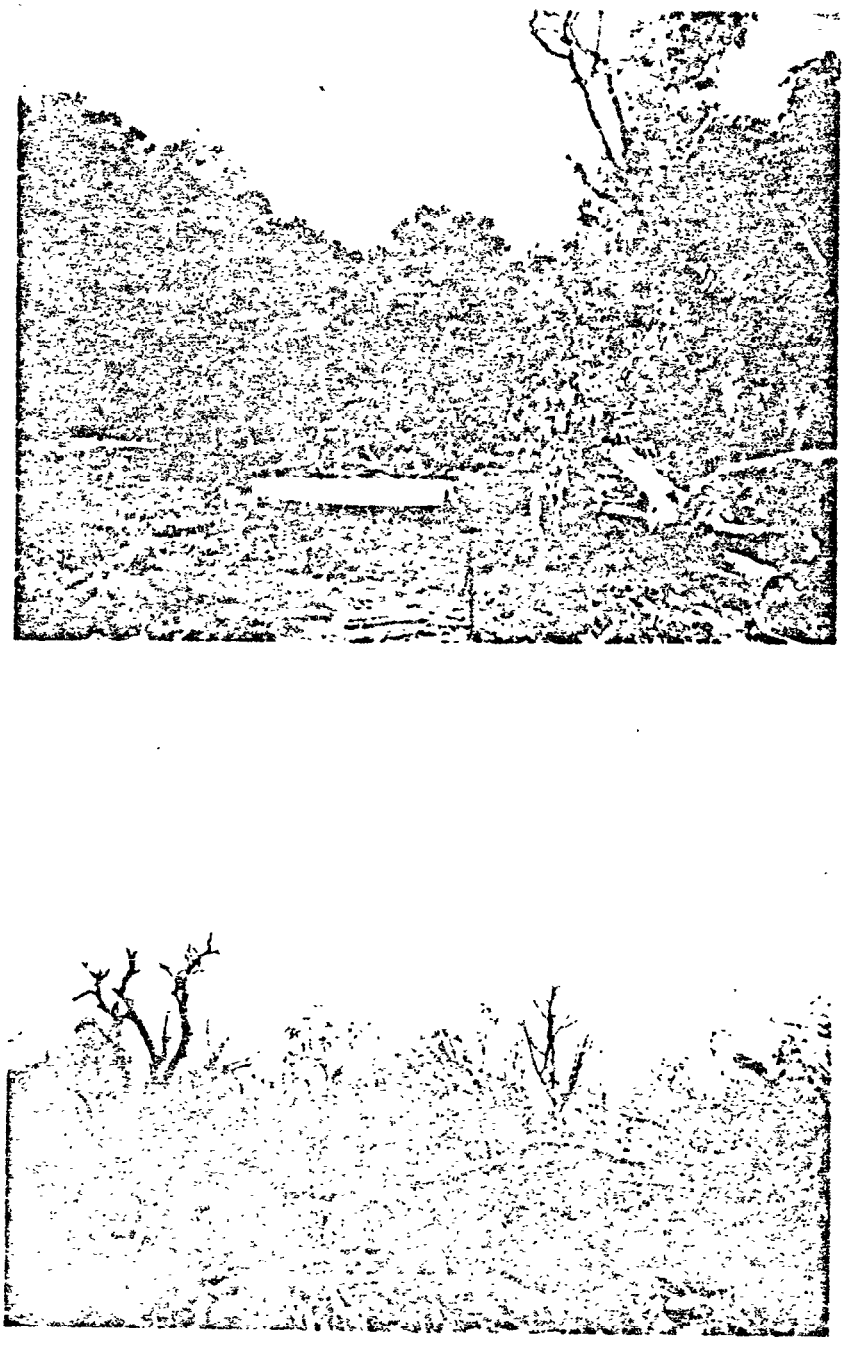

Fig. 3.8 Uncle Island Tree Stand, Before and After Shot 3, Looking Away from Ground Zero.
Ground Range: 9300 ft
Peak Static Overpressure (from Fig. 4.1): 3.8 psi

Fig. 3.9 Uncle Island Pisonia Sample Plot D, After Shot 3, Looking Away from Ground Zero. (Preshot view, Fig. 3.4.)
Ground Range: 10,150 ft
Peak Static Overpressure (from Fig. 4.1): 3.3 psi

CHAPTER 4

DISCUSSION

All experiment objectives were partially met in spite of unexpected deviation from the predicted yields of Shots 1 and 3. Shot 1 yield was much larger than expected which resulted in heavy damage to stands on William and Victor Islands and light damage to a portion of Uncle Island stand. The yield of Shot 3, for which the experiment was designed, was much lower than predicted; however, the entire Uncle Island stand was heavily damaged. This heavy damage overlapped the Shot 1 light damage region on the upper end of Uncle Island. Negligible deflection of snubber trees on Victor and William Islands for Shot 3 placed these islands in a no-damage region. Thus two graded series of damage were secured--one from a high yield weapon, and one from a medium yield weapon.

Measured peak static overpressure values for Shot 3 through the mixed palm-broadleaf Uncle Island stand (Fig. 4.1) are in general within -5 and +15 per cent of curve values prepared from free field measurements adjacent to the stand. Results of these measurements taken at stations over a distance of 2000 ft into the stand do not indicate any peak static overpressure attenuation.

For Shot 3, the three dynamic pressure gages, one outside and one inside Uncle Island tree stand and one outside the stand on Victor Island, recorded peak dynamic pressures respectively 1.9, 5.6, and 33 times greater than values calculated from corresponding peak static overpressure measurements. The single free field measurement along the blast line, at 6500 ft, adjacent to the Uncle Island stand was greater than the calculated value by 10 per cent. In light of these unreasonably high peak dynamic pressure measurements, both outside and inside Uncle Island stand, the amount of attenuation of the peak dynamic pressure in an extensive tree stand remains an open question.

Isodamage curves presented in Fig. 4.2 are one of a set of curves prepared for inclusion in Capabilities Handbook[1/] and are the results of theoretical analysis of dynamic breakage due to shock loading. The

1/ AFSWP, Capabilities of Atomic Weapons, TM 23-200.

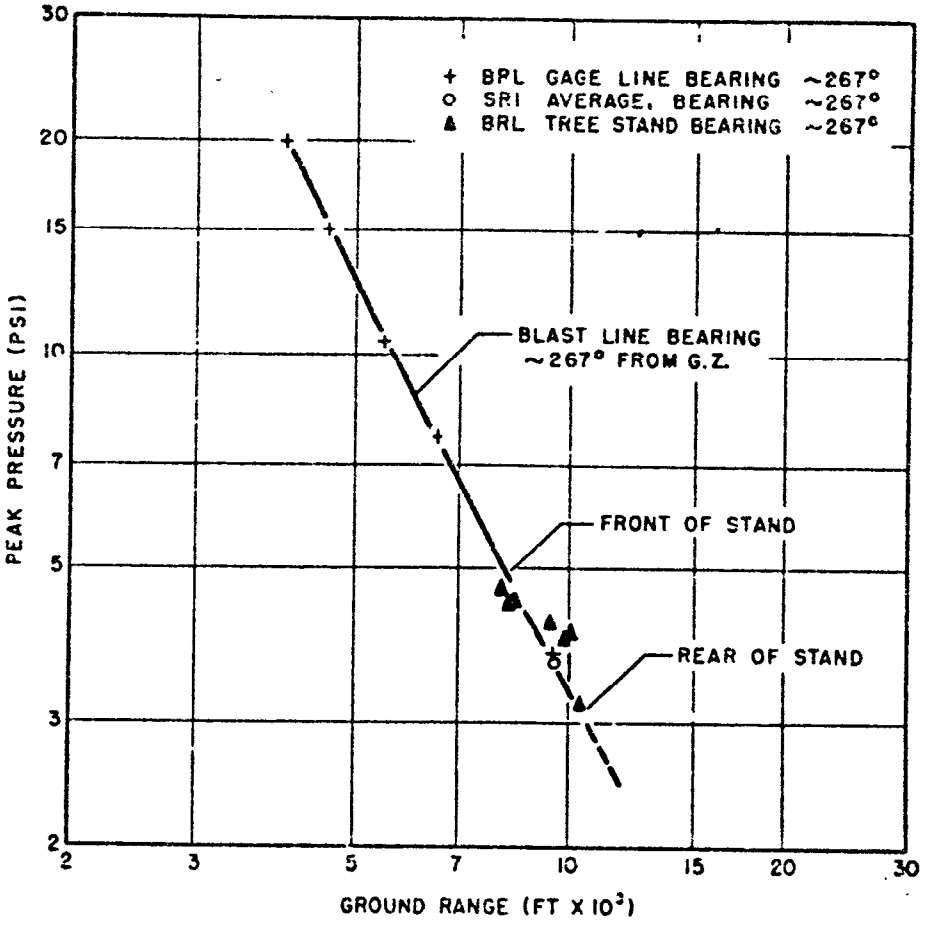

Fig. 4.1 Comparison of Uncle Island Tree Stand and Free Field Peak Static Overpressure Measurements--Shot 3

procedure leading to prediction of breakage has been outlined in detail in a previous report.[2]

Breakage calculations have been carried out for a range of 1KT to 10MT. Positive phase duration was static overpressure scaled.[3] In each case a curve of damage vs peak dynamic pressure was obtained for a number of dynamic pressure wave form factors. By choosing a specific degree of damage (i.e., light or heavy) a corresponding peak dynamic pressure was obtained for each wave form factor. Plotting these calculated points on a composite HOB-dynamic pressure-wave form factor curve[4] results in isodamage curves similar to Figure 4.2 for each yield investigated.

2/ AFSWP, UPSHOT-KNOTHOLE, Project 3.19.

3/ Sandia Corporation, Methods for Estimating Blast Loading on Simple Structures, September, 1953, SECRET--Restricted Data.

4/ U. S. Dept. of Agriculture, Forest Service, Div. of Fire Research, Dynamic Pressure Wave Form-Height of Burst Curves, Interim Tech. Report AFSWP-419, February 10, 1955, SECRET.

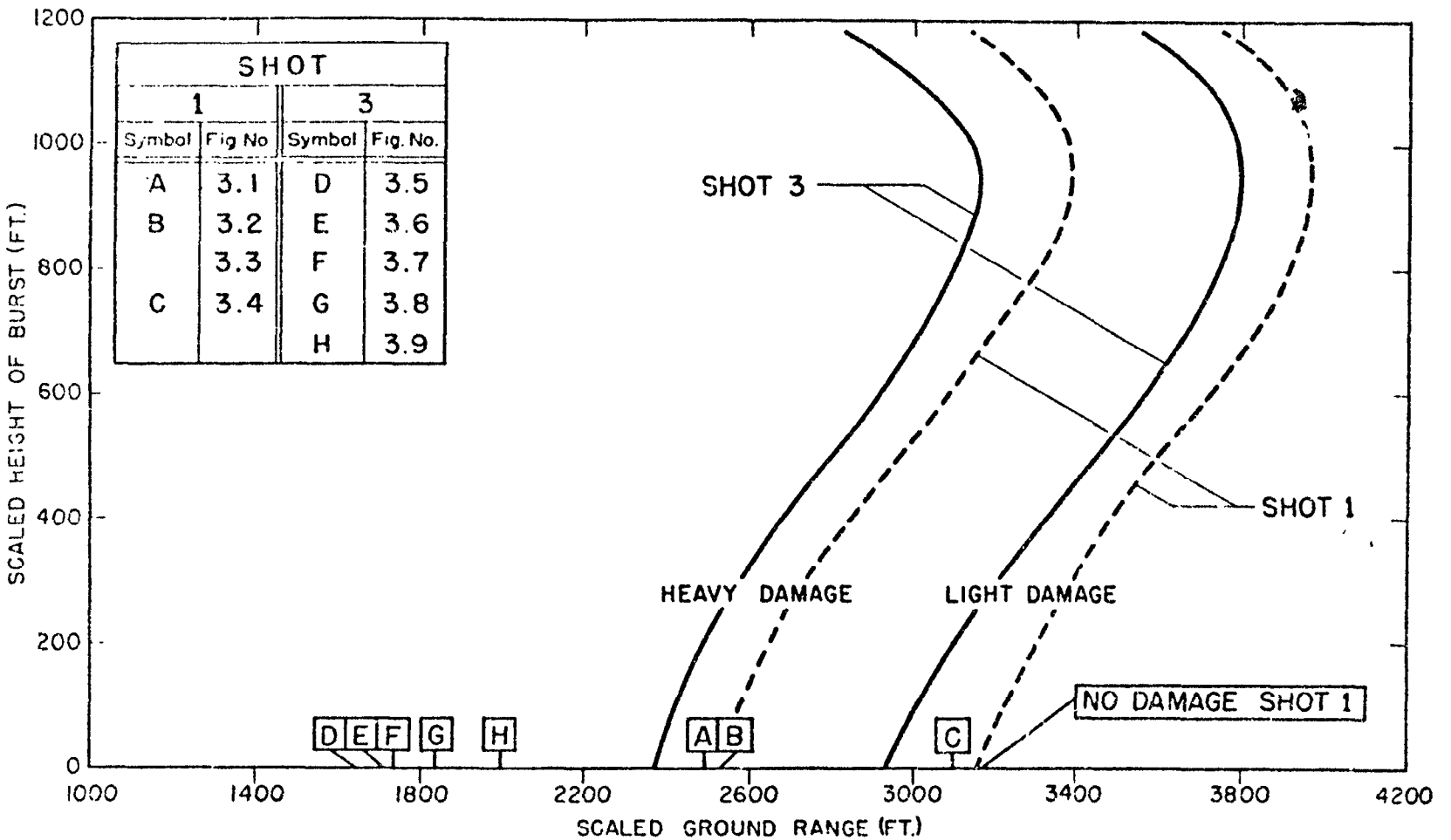

Fig. 4.2 Comparison of Damage from Shots 1 and 3 with Predicted Isodamage Curves for Broadleaf Tree Stand

Differences due to weapon yield are the results of variation of positive phase duration with respect to tree natural period, i.e., the period modulus. Since the period modulus for 110KT is already sufficiently small the reduction in period modulus due to the larger yield (14.5MT) does not lead to a corresponding decrease in dynamic pressure modulus.[5/]

Isodamage curves shown delineate light and heavy damage to broadleaf tree stands resulting from 15MT and 130KT weapons. The criteria for light and heavy damage given in Table 4.1 are based on total length of stems and limbs on the ground, and are estimates of two degrees of damage in impeding movement of military personnel and vehicles. It should be pointed out here that the criteria used in arriving at the two degrees of damage have no experimental basis.

The degree of damage to William Island and Victor Island Pisonia stands from Shot 1 was considered as heavy. Scaled distances of William Island and Victor Island locations from Shot 1 are shown on Fig. 4.2 by symbols "A" and "B," respectively. The damage based on trees damaged on Victor Island Pisonia plot (Fig. 3.2) by Shot 1 was assessed as 65 per cent. The damage consisted of stem and limb breakage with some uprooting. The 65 per cent damage value was consistent with observations of the stand as a whole.

TABLE 4.1 - Criteria for Two Degrees of Damage--
Broadleaf Stands, Stocking 196 Trees/Acre

Degree of Damage	Trees Damaged (%)	Length of Stems and Limbs Down on the Ground (ft/acre)
Light	10	1500
Heavy	60	9000

The degree of damage from Shot 1 to trees on Uncle Island Pisonia plot (Fig. 3.4) was assessed as 30 per cent or light damage. Scaled ground range of this plot is shown by symbol "C" on Fig. 4.2. For Shot 1, no damage resulted to Uncle Island stand beyond a scaled ground range of 3180 ft. The nearness of light damage and no damage might suggest shock attenuation by the stand. However, the area of no damage consisted mostly of palm and small broadleaf trees as contrasted with the light damage region where inherently weaker Pisonia trees predominated. This change in the Uncle Island stand composition did not permit estimation of the amount of shock attenuation from observations of degree of damage with distance.

The degree of damage by Shot 3 to Uncle Island stand as a whole was assessed as heavy. Scaled distances of locations illustrated by Figs. 3.5 through 3.9 are shown on Fig. 4.2 by symbols "D" to "H," inclusive. The tallied stem breakage of trees on the sample plots, excluding small diameter broadleaf trees, was 58 per cent. According to Table 4.1,

5/ AFSWP, UPSHOT-KNOTHOLE, Project 3.19, Fig. 1.3.

percentage of damage falls close to the percentage necessary for heavy damage. However, heavy damage to the small broadleaf trees throughout the stand area indicated that had the sample plots been fully stocked with larger broadleaf trees the percentage breakage would have exceeded this value.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

1. Ground level pressure measurements 2000 ft into a tree stand substantiate UPSHOT-KNOTHOLE conclusion of no attenuation in peak static overpressure; therefore, for this purpose further measurements of overpressure in tree stands should not be necessary.

2. It was not possible to assess the stand influence by observation of damage because of non-uniformity of stand composition; nor was it possible to determine the peak dynamic pressure attenuation because the three gages in or near the stands showed large unexplained variation.

3. Observed damage from two weapons of different yields compare favorably with isodamage curves prepared for broadleaf stands.

4. Damage in broadleaf stands is principally limb breakage and defoliation with occasional breakage of the main stem or uprooting.

5. Snubber wire arrangement for measurement of maximum deflection of tree stem is not feasible in a forested area composed of broadleaf trees and brush species where limb breakage is the principal form of damage.

5.2 RECOMMENDATIONS

In future operations, where a detonation (preferably an air burst) is near or over forested areas, projects should be programed to obtain additional damage data on tree stands, and to secure needed peak dynamic pressure data for assessing the amount of attenuation. In that event duplicate gage installation at all stations is advisable.

In about two years, growth of vegetation on Uncle, Victor, and William Islands should be sufficient in amount to provide areas for studying attenuation of dynamic pressure. However, it will take many years before the growth will be sufficient to study tree damage.

NOMENCLATURE

H_b = height of tree above 5-ft mark, ft

d_b = stem diameter at 5-ft above ground level, in.

H_r = height above ground at which deflection measurements were made, ft

d_r = stem diameter at deflection measurement point, in.

H_c = height of crown base above ground, ft

d_c = stem diameter of crown base, in.

H_{br} = height of break above ground, ft

τ_t = tree natural period, sec

τ_s = bare stem natural period, sec

W_{dc} = weight of dry crown, lb

R_b = horizontal applied force at breakage, lb

y_b = arc deflection at breakage, ft

END

DATE

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7-65

SECRET

HEADQUARTERS, Joint Task Force SEVEN
APO 187 (HOW), c/o Postmaster
San Francisco, California
7 May 1954

REDWING
REF: B.O.1

Operation Order
CJTF SEVEN No. 2-54 (Interim Phase Operation Order)

Chart References: a. U.S. Navy Hydrographic Chart No. 5203, North Pacific Ocean, Marshall Islands.

b. U.S. Navy Hydrographic Chart No. 6033, North Pacific Ocean, Marshall Islands

Task Organization

a. Task Group 7.1 (Scientific)

b. Task Group 7.2 (Army)

c. Task Group 7.3 (Navy)

d. Task Group 7.4 (Air Force)

e. Task Group 7.5 (AEC Base Facilities)

1. General

a. Scope of Instructions

(1) This operation order covers that period between the completion of the CASTLE operational phase and the beginning of buildup for the subsequent test (REDWING, scheduled for the Spring of 1956).

(2) "Forward Area" as the term is used in this order is defined as that area encompassing the MARSHALL ISLANDS.

(3) "Closed Area", as the term is used in this order is defined as including the land area of ENIWETOK and BIKINI ATOLLS, the water area of the lagoons and the water areas within the three (3) miles to the seaward side of the respective land areas. The BIKINI Closed Area will be established to provide for safety of transient personnel. The task force will not be required to maintain its status as a Closed Area.

(4) "Atoll Commander, ENIWETOK (ATCOM)", as the term is used in this order, exercises direction of all JTF SEVEN military forces based at ENIWETOK ATOLL in pursuit of his duties outlined in this order.

b. General Situation

(1) Upon departure of Commander, Joint Task Force SEVEN (CJTF SEVEN) and major elements of the task force from the forward area, Commander, Task Group 7.2 (CTG 7.2) will assume responsibilities of ATCOM.

(2) At a date to be agreed upon by CJTF SEVEN and the Atomic Energy Commission (AEC), CJTF SEVEN will cease to act as the AEC representative for CASTLE matters at the Pacific Proving Ground. Previous operational arrangements with AEC activities will then be resumed. CJTF SEVEN will negotiate directly with AEC and with Los Alamos Scientific Laboratory (LASL).

31 July 1967

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JTF SEVEN Log No. S-312-54E

54-S-8471

(3) By authority of the JCS, CJTF SEVEN exercises full operational control of the Army Task Group at all times and operational control of other task groups for planning and coordination only. (See Annex A for definition of operational control)

(4) By decision of the JCS on 13 April 1951, CJTF will report to the appropriate commander under the JCS (CINCPAC) for movement control, logistic support and for the purpose of general security with respect to the task force and ENIWETOK ATOLL. In the absence of the task force commander from the ENIWETOK area, ATCOM will report to CINCPAC for these purposes.

(5) The ENIWETOK-BIKINI Danger Area as defined in CJTF SEVEN Operation Order No. 3-53 and the enlarged area used during CASTLE operational phase will be disestablished as such during the interim period. A new, enlarged Danger Area will be established for use during the on-site operational phase of REDWING.

(6) Since the BIKINI Closed Area will be established as such for personnel safety only, ATCOM will not be required to maintain its status as a closed area.

(7) Security, Intelligence and Public Information: See Annex B.

(8) Friendly Forces. JTF SEVEN consists of units from the Military Services and personnel of the AEC, its contractors, subcontractors and other participating agencies. ATCOM will be further guided by CINCPAC General Emergency Operation Plan (GEOP) No. 11-53.

2. Mission

a. JTF SEVEN will:

(1) Effect the efficient and expeditious resumption of interim phase activities in order to provide for continuity of operations prior to the commencement of buildup for REDWING.

(2) Provide for the continued security of ENIWETOK ATOLL and such other areas as may be designated by CINCPAC, within the capability of the military forces provided.

(3) Complete the history, analyses and final report of Operation CASTLE.

(4) Effect the efficient and expeditious disposition and redeployment of personnel, equipment and material employed in Operation CASTLE.

3. Tasks for Subordinate Units

a. Task Group 7.1 (TG 7.1) will:

(1) Execute preliminary and final report programs.

(2) Continue analyses of tests and experiments and complete technical reports of Operation CASTLE.

(3) Continue operation with a view toward maintaining a test organization for Operation REDWING, with headquarters at Los Alamos, New Mexico.

(4) Complete the non-technical photography mission for CASTLE.

(5) Return to the ZI, or other appropriate destination, all personnel no longer required in the forward area as quickly as they become surplus.

(6) At the earliest appropriate time, submit to CJTF SEVEN the scientific and preliminary operational aspects of the concept for Operation REDWING.

b. Task Group 7.2 (TG 7.2) will:

(1) Upon departure of CJTF SEVEN from the forward area, discharge the responsibilities of CJTF SEVEN as ATCOM in accordance with CINCPAC GEOP No. 11-53.

(2) Exercise direction of all JTF SEVEN military forces based at ENIWETOK ATOLL for movement control, logistic support, general security and other duties of ATCOM as defined in Paragraph 1a(4) above.

(3) Re-establish the forward area garrison force and provide base facilities (except POL and fire fighting facilities) for tenant units and military personnel therein, with prorated share of KP's provided by each unit. Each unit will provide barracks orderlies for barracks assigned to the respective units and will assist TG 7.2 in such functions as periodic off-loading of cargo vessels and area clean-up details in areas used jointly by all units.

(4) Provide for the security and ground defense of ENIWETOK ATOLL within capability of forces assigned.

(5) Provide and operate the military communications system. Annex D applies.

(6) Provide all RadSafe functions for ENIWETOK Island.

c. Task Group 7.3 (TG 7.3) will:

(1) Assist TG 7.2 in re-establishing the TG 7.2 boat pool (Navy Detachment). Insure that the TG 7.2 Boat Pool (2 LCMs, 2 LCPLs and 1 AVR), is in good order.

(2) Make available the space aboard task force vessels to assist in the movement of personnel, material and equipment to the ZI.

(3) Release elements of TG 7.3 to parent organizations after required tasks have been accomplished.

(4) Re-establish a reduced TG 7.3 headquarters in Washington, D.C., in order to retain continuity in planning of REDWING.

d. Task Group 7.4 (TG 7.4) will:

(1) Return aircraft and equipment to parent organizations upon completion of CASTLE missions, with the exception of aircraft and equipment required for the interim missions.

(2) Establish a reduced air detachment at ENIWETOK to provide for inter-island air transportation, Airways and Air Communication Service (AACS), weather service, airbase facilities and maintenance of stored Air Force equipment and supplies. Equipment to remain at ENIWETOK will include four (4) H-19B helicopters, six (6) L-20 aircraft and two (2) C-47 aircraft.

(3) Prepare, coordinating with CTG 7.2 and implement a plan for storage of Air Task Group equipment at ENIWETOK and for basing the reduced air detachment at that location.

(4) Return to the ZI, or other appropriate destination, all Air Task Group personnel whose services are no longer required in the forward area.

(5) Disestablish outlying weather stations.

(6) Operate POL and fire fighting facilities on ENIWETOK ISLAND.

(7) Re-establish a reduced TG 7.4 headquarters at Kirtland AFB. TG 7.4 headquarters may be moved to the Washington, D.C. area at a later date to provide for closer continuity in planning.

(8) The air detachment at ENIWETOK will assist TG 7.2 in such functions as indicated in Paragraph 3b(3) above.

d. Task Group 7.5 (TG 7.5) will:

(1) Assist in the decontamination of AEC facilities and equipment.

(2) Redeploy contractor personnel as they become surplus to requirements.

(3) Continue to render necessary AEC contractor support to TG 7.1 in accomplishment of TG 7.1 missions.

(4) Conduct necessary liaison with CTG 7.2 to insure coordinated effort in the defense against hostile action and natural disaster.

(5) Operate, manage and direct camp facilities at the Pacific Proving Ground, less facilities on ENIWETOK Island charged to other units.

(6) Assist TG 7.2 in the conduct of port and stevedoring operations at ENIWETOK in accordance with existing agreements.

(7) Assume residual RadSafe functions at the Pacific Proving Ground (PPG) except ENIWETOK Island.

x. All Task Groups will:

(1) Develop and maintain current plans to implement instructions contained in this order. Copies of plans will be submitted so as to reach this headquarters not later than 1 July 1954.

4. Administrative and Logistical Matters

a. CJTF SEVEN Administrative Order No. 2-53 applies (Annex A to CJTF SEVEN Admin Order No. 2-53 will be revised at the completion of CASTLE roll-up).

b. CTG 7.2 is authorized to issue local administrative orders not in conflict with CJTF SEVEN and Service directives embracing all task force elements in the forward area. This will include such items as normal base regulations, i.e., speed limits, mess hours and safety instructions.

5. Command and Signal Matters

a. Command Relationships - Annex A applies. Also see CJTF SEVEN letter, subject: "Exercise of Command", dated 2 October 1953.

b. Command Posts

CJTF SEVEN	-	Washington 25, D.C.
CTG 7.1	-	Los Alamos Scientific Laboratory, Los Alamos, New Mexico.
CTG 7.2	-	ENIWETOK Island, MARSHALL Islands.
CTG 7.3	-	Naval Gun Factory, Washington 25, D.C.
CTG 7.4	-	Kirtland AFB, Albuquerque, New Mexico.
CTG 7.5	-	Santa Fe Operations Office, Albuquerque, New Mexico.

c. Communications - Annex D applies.

d. Time zone "M" applies for forward area activities.

P. W. CLARKSON
Major General, U.S. Army
Commander

Annexes:

A - Organization and Command Relationships
B - Security, Intelligence and Public Information
C - Logistics
D - Communications

Operation Order
CJTF SEVEN No. 2-54

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ARMY AGENCIES

ACofS, G-3, USA, Washington 25, D.C.	1
CG, USARPAC, APO 958, c/o PM, San Francisco, Calif	1

NAVY AGENCIES

CNO (Op-36), Washington 25, D.C.	1
CINCPAC, Navy #128, c/o FPO, San Francisco, Calif.	1
CINCPACFLT, Navy #128, c/o FPO, San Francisco, Calif	1
CO, NAVSTA KWAJALEIN, Navy #824, c/o FPO, San Francisco, Calif	1

AIR FORCE AGENCIES

DCofS, Operations, USAF, Washington 25, D.C.	2
COMATS, Andrews AFB, Washington 25, D.C.	1

DOD AGENCIES

Chief, AFSWP, Box 2610, Washington 25, D.C.	1

AEC AGENCIES

Chairman, AEC, 1901 Constitution Avenue, Washington 25, D.C.	1
DMA, AEC, 1901 Constitution Avenue, Washington 25, D. C.	1
Manager, SFOO, Box 5400, Albuquerque, New Mexico	1
Manager, San Francisco Operations Office, AEC, 200 Bush Street San Francisco 4, Calif	1
Manager of Operations, USAEC, P.O. Box 30, Ansonia Station, New York 23, N.Y. (ATTN: Mr. Merril Eisenbud)	1

JTF SEVEN AGENCIES

CTG 7.1, Box 1663, Los Alamos, New Mexico	10
CTG 7.2, APO 187, c/o PM, San Francisco, Calif	5
CTG 7.3, Washington 25, D.C.	10
CTG 7.4, Kirtland AFB, New Mexico	10
CTG 7.5, Box 5400, Albuquerque New Mexico	8
JTF SEVEN LNO, Travis AFB, Calif	1
JTF SEVEN LNO, NSC, Oakland Calif	1
JTF SEVEN LNO, Hickam AFB, Box 440, APO 953, c/o PM, San Francisco, Calif.	1
JTF SEVEN LNO, Kwajalein, Navy #824, c/o FPO, San Francisco, Calif.	1
JTF SEVEN Scientific Director, Box 1663, Los Alamos, New Mexico	1

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HEADQUARTERS, Joint Task Force SEVEN
APO 187 (HON), c/o Postmaster
San Francisco, California
7 May 1954

Annex A to CJTF SEVEN Operation Order No. 2-54

ORGANIZATION AND COMMAND RELATIONSHIPS

1. On 31 March 1953, the JCS established JTF SEVEN (formerly JTF 132) as a permanent joint task force for the purpose of conducting overseas atomic tests. Accordingly, it is contemplated that certain command relationship principles previously established by the commander of a joint task force under JCS-AEC authority will continue to obtain. Under this command relationship concept, the Commander, JTF SEVEN:

   a. Exercises full operational control of the Army Task Group at all times.

   b. During the period between on-site operational phases, exercises operational control of all task groups for planning and coordination. "Operational control for planning and coordination" is defined as such authoritative direction in planning and preparation as is necessary to insure successful accomplishment of the joint task force mission.

   c. Assumes full operational control of each task group upon arrival of their respective headquarters in the forward area. The on-site operational phase commences with the establishment of JTF SEVEN Headquarters in the forward area. During the on-site phase the AEC designates CJTF SEVEN as its senior representative in the forward area, thereby giving the task force commander complete operational control of the military and scientific aspects of the operation. Normal administrative control of task groups (other than TG 7.2) and their elements is exercised by their own administrative agencies.

2. The Commander, JTF SEVEN will coordinate the activities of the Scientific Task Group and the AEC Base Facilities Task Group through his Scientific Director in accordance with AEC-CJTF policy agreements.

3. In the absence of the task force commander from the ENIWETOK area, the Army Task Group commander will discharge the responsibilities of CJTF SEVEN as ATCOM, ENIWETOK.

P. W. CLARKSON
Major General, U.S. Army
Commander

OFFICIAL:

W. S. COURT, JR.
Colonel, U. S. Air Force
Assistant Chief of Staff, J-3

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SECRET

HEADQUARTERS, Joint Task Force SEVEN
APO 187 (HOW) c/o Postmaster
San Francisco, California
7 May 1954 .

Annex B to CJTF SEVEN Operation Order No. 2-54

INTELLIGENCE, SECURITY AND PUBLIC INFORMATION

1. Intelligence.

a. Effect of Enemy Capabilities on JTF SEVEN. The capabilities listed below make it possible for the enemy (considered herein as the Soviets) to take the following action against the operational area:

(1) Submarine reconnaissance.

(2) Air reconnaissance.

(3) Ground reconnaissance or sabotage by landing parties from submarine.

(4) Raids from submarines or surface ships.

(5) Raids by aircraft.

b. Conclusions. Capability (1) is considered the most likely to occur under conditions existing today. Capability (2) is a possibility but is less likely and capabilities (3), (4) and (5) most likely would be exercised in the event of open hostilities between the United States and the USSR. It is believed that information as to the operations of JTF SEVEN and the results thereof would be of more practical value to the Soviets than hindering or impeding the operation.

2. Security. Security of classified information is the normal responsibility of any commander but this responsibility must be reevaluated in the Pacific Proving Grounds where these operations are dealing with Atomic Energy, a development which played an important part in terminating World War II and which constitutes such importance that it has been regulated, controlled and protected by Federal law. The responsibility of each individual in properly safeguarding classified information concerning atomic energy and in preventing its compromise by careless talk or correspondence must be understood by all military ranks and civilians.

3. General Conception. The general conception of the measures to provide security during the non-operational period are generally the same as during operational periods except where local conditions render them inapplicable. These measures are as follows:

a. ENIWETOK ATOLL is under the general protection of CINCPAC.

b. ENIWETOK ATOLL is closed to all vessels, aircraft and personnel except those cleared for access in accordance with the provisions established by CINCPAC Serial 020, dated 1 April 1952.

c. All assigned personnel will be cleared for loyalty and security in accordance with the varying degrees of responsibility.

SECRET

d. Regulations governing security published by the DOD and the AEC continue to apply to members of JTF SEVEN.

(1)	AR 380-5 and SR 380-5-1 OPNAV Instructions 5510.1 AR 205-1	For appropriate units
(2)	Hq JTF SEVEN Security Memoranda Espionage Act Atomic Energy Act of 1946 AEC-DOD Classification criteria	Apply to all members of JTF SEVEN

e. Commanders are responsible for security training of members of their commands. Prior to the commencement of the operational phase all personnel will be required to pass a basic security examination, prepared and distributed by Headquarters, JTF SEVEN.

f. Each Task Group will have an officer designated as Security Officer, whose primary duties will include security training, enforcement of security regulations, and supervising the administering, grading and recording of security examinations.

4. Personnel Clearances. Commanders are responsible that all personnel assigned to JTF SEVEN are cleared in accordance with CJTF SEVEN security memoranda.

5. Classification Criteria. "Classification Guide for Operation CASTLE" concerning all pertinent classification criteria will be used until rescinded and replaced.

6. Travel Security Control.

a. CINCPAC Serial 020, dated 1 April 1952, outlines the requirements for entrance to ENIWETOK ATOLL.

b. All persons who are authorized to enter the ENIWETOK ATOLL area will be initially cleared for entry under the provisions of CINCPAC Serial 020. CTG 7.2 may authorize reentry without recourse to CINCPAC.

c. CTG 7.2 is responsible that individuals arriving at ENIWETOK ATOLL, who have not been cleared for entry under CINCPAC Serial 020, or reentry as provided in paragraph 6b, above, are restricted to ENIWETOK Island and unclassified information pending proper clearance.

d. Movements of surface vessels and aircraft within the ENIWETOK ATOLL Closed Area will be monitored by CTG 7.2, who will be responsible for the security control of personnel and cargo on vessels and aircraft originally arriving at ENIWETOK ATOLL and any further arrivals that may be occasioned by inter-atoll travel.

7. Contraband.

a. Unless authorized by specific orders to individuals, possession of items of material listed below in the ENIWETOK area is prohibited and the items considered contraband.

(1) All photographic equipment.

(2) All equipment designed for use in either visual or electrical communications.

(3) All optical equipment such as binoculars and telescopes.

(4) All materials with explosive capabilities.

(5) All weapons except ordinary pocket and sheath knives.

(6) All drugs and narcotics.

b. Travel orders for all personnel destined for ENIWETOK ATOLL Closed Area will include the following statement:

"Unless specifically authorized, personnel will not have in their possession any items of material to include all photographic equipment, all equipment adaptable for use in either visual or electrical communications, all optical equipment, all material with explosive capabilities, weapons, and all drugs, and narcotics."

c. Items of contraband will be confiscated and a report of the circumstances made to CJTF SEVEN.

d. Film found in possession of unauthorized persons will be confiscated, processed, reviewed for classification and a report will be made to CJTF SEVEN.

8. Photography. Only official photography is authorized in the ENIWETOK operational area. CTG 7.2 is authorized to determine the extent of administrative photography necessary to the accomplishment of his mission and to control the execution thereof. Administrative photography will not be accomplished at any island or area other than those islands or areas where administrative photography is required to accomplish the assigned photographic mission. CTG 7.2 is authorized to process and classify all administrative photography taken at his direction.

9. Counter-Intelligence. CTG 7.2 will assume counter-intelligence responsibility for the ENIWETOK ATOLL Closed Area and will coordinate with the officials of the Pacific Proving Grounds to outline areas of responsibility.

10. Inspections. Inspections will be conducted upon arrival of personnel and periodically thereafter to detect security violations and contraband and to insure the use of proper identification credentials and proper safeguarding of classified matter. Individuals are responsible for reporting security violations which come to their attention.

11. Security Violations. CTG 7.2 is responsible for investigating and reporting immediately all violations of security regulations which occur within his jurisdiction.

Intelligence, Security and Public Information
CJTF SEVEN No. 2-54

12. Public Information.

a. JTF SEVEN does not release any public information.

b. Releases to the press in regard to JTF SEVEN operations and activities are made only by the AEC or DOD.

c. Personnel of JTF SEVEN are prohibited from releasing any information for publication, in regard to the task force or its activities. They must neither confirm nor deny any articles appearing in the press. Queries from the press or elsewhere will be referred to AEC-DOD releases.

d. AEC-DOD releases, when made, will be disseminated to units of JTF SEVEN through normal communication channels at the earliest possible time.

P. W. CLARKSON
Major General, U.S. Army
Commander

OFFICIAL:

S. P. WALKER, JR.
Colonel, U.S. Army
Assistant Chief of Staff, J-2

HEADQUARTERS, Joint Task Force SEVEN
APO 187 (HOT), c/o Postmaster
San Francisco, California
7 May 1954

Annex C to CJTF SEVEN Operation Order No. 2-54

LOGISTICS

(This Annex will be Distributed at a Later Date)

Headquarters
Joint Task Force SEVEN
Washington 25, D. C.
28 July 1954

Annex C to CJTF SEVEN Operation Order No. 2-54

LOGISTICS

1. General. Logistical support of Joint Task Force SEVEN from 1 July 1954 to the beginning of the next operation will be provided as follows:

a. The Military Services, through existing supply and service agencies, will furnish logistical support for the elements of the task force.

b. The Atomic Energy Commission (AEC), through its appropriate field agencies, provides logistical support for the AEC elements of the task force.

c. Cross-servicing between the AEC and the Military Services is authori per existing regulations and agreements of the AEC and the Department of Defense (DOD).

d. Military sea and air transportation from the continental United Stat (CONUS) to the forward area and intermediate points will be provided all elements of the task force, the AEC, and its contractors by Military Sea Transportation Service (MSTS) and Military Air Transport Service (MATS).

e. Supply requisitions will be submitted direct to the appropriate supply agency for necessary action. An information copy of requisitions for major, controlled, or emergency items of military supplies and equipment will be furnished Headquarters, Joint Task Force SEVEN, ATTN: J-4.

f. Should assistance be required on any logistics problem, full background information and justification will be furnished Headquarters, Joint Task Force SEVEN, ATTN: J-4.

2. Internal Missions. The following logistical missions are assigned to th task group commanders:

a. The AEC, through its scientific (TG 7.1) and support contractors provides equipment and technical materials required for implementation of the future test program.

b. The Commander, Task Group 7.2 (CTG 7.2), will be responsible for or will furnish all elements of the task force on ENIWETOK ISLAND, on a reimbursable basis (JTF SEVEN SOP 170-1) when required, the following logistical and administrative support:

✓(1) Supply and maintenance of all TG 7.2 equipment.

✓(2) Supply and maintenance of all 1/4, 3/4 and 2 1/2 ton general purpose vehicles.

✓(3) QM cleaning and preserving materials.

(4) Clothing and equipage repair.

(5) Salvage.

✓(6) Bedding and barracks furniture.

(7) Expendable office supplies.

(8) Building assignments.

(9) Personnel housing assignments (each element will furnish own orderlies).

(10) Mess (each element will furnish pro rata share of KPs).

(11) Bakery.

(12) Medical and Dental.

(13) Mortuary.

(14) Sanitation.

(15) Communications (See Annex D).

(16) Water cargo handling, assisted by personnel of the 4930th TSG.

(17) Chaplain (Religious services).

(18) Finance and Disbursing.

(19) Postal.

(20) Laundry.

(21) Post exchanges and concessions.

(22) Barber.

(23) Officer and NCO Clubs.

(24) MPs.

(25) Red Cross.

(26) Special Services.

(27) Budgeting and fiscal accounting for non-aviation (class 06B) POL on Eniwetok Island.

c. Task Group 7.3. No foreseeable action required in the forward area during the interim operational phase other than the furnishing of appropriate type vessels to service mooring facilities and perform navigational survey work.

d. The Commander, 4930th TSG, will perform the following logistical functions at ENIWETOK ISLAND:

(1) Accountability and responsibility for the operation of the POL facilities.

(2) Assume responsibility for all fire fighting equipment and is responsible for the operation and maintenance of the fire department. When fire fighting equipment becomes unserviceable, replacement will be obtained through Air Force supply channels.

(3) Furnish prorata share of KPs to TG 7.2. ?

(4) Furnish orderlies for buildings occupied by 4930th TSG personnel.

(5) Furnish pro rata share of stevedores to TG 7.2, to assist in the periodic working of cargo ships at Eniwetok.

(6) Communications (See Annex J).

(7) Supply and maintenance of Air Force equipment, including vehicles other than those indicated in paragraph 2.b.(2) above.

(8) Responsible for the policing of assigned areas.

(9) Provide inter-island air transportation.

(10) Air cargo handling.

(11) Operation of airfield facilities.

(12) Provide pro rata share of clean-up details to TG 7.2 in areas used jointly.

(13) Supplies and spare parts required by the 4930th TSG other than those indicated in paragraphs 2.b (1), (2), (3), and (6) above.

e. The AEC, through its support contractor, provides subsistance, quarters, laundry, medical, recreation, and other camp services on PARRY ISLAND: provides warehousing and property accounting facilities for materials shipped to the forward area as required; provides construction materials required for future test programs; maintains fixed facilities on PARRY and ENIWETOK ISLAND and operates the AEC boat pool.

f. Communications (See Annex D).

3. Supply

a. Class I:

(1) Supply Points:

(a) Military - Oversea Supply Agency, Fort Mason, Calif. (OSA).

(b) AEC Contractor - Through respective supply agencies.

(2) Requisitioning - Military subsistence requisitions for the ENIWETOK ISLAND garrison force will be submitted direct to supply point and will be based on the following:

(a) Joint Task Force SEVEN menu.

(b) Thirty (30) day consumption period.

(c) Ninety (90) day ordering and shipping time for perishables and one hundred twenty (120) days for non-perishables.

(d) Fifteen (15) day reserve for perishables and thirty (30) days for non-perishables.

(e) AEC Contractor - requisitions as appropriate.

(3) Rationing

(a) A consolidated mess will be operated on ENIWETOK ISLAND by CTG 7.2. This mess will serve all personnel stationed on that island. Officer and civilian personnel will be fed on a cash and/or reimbursable basis.

(b) A mess is operated on PARRY ISLAND by the AEC contractor. Military personnel will be fed in this mess on a cash and/or reimbursable basis.

(4) Sales

(a) The transfer of subsistence between the ENIWETOK garrison and the AEC contractor, transient aircraft, and transient ships is authorized.

(b) Such transfer will be on a reimbursable basis.

(5) Special Reserve

(a) A special reserve of two (2) days operational rations (type C) will be maintained by CTG 7.2.

(b) This reserve will be based on the entire population of the ENIWETOK ATOLL (military and civilian) and will be used only in an emergency when existing cooking facilities have been destroyed or rendered inoperative. The consolidated mess on ENIWETOK ISLAND will be periodically supplemented with these rations to assure turn-over and to prevent spoilage of the stocks.

b. Class II and IV:

(1) Supply Points

(a) Army - OSA, Fort Mason, California.

(b) Navy - Naval Supply Center (NSC), Oakland, California.

(c) Air Force - Sacramento Air Materiel Area, California (SMAMA).

(d) AEC Contractor - Through appropriate supply agencies.

(2) Requisitioning

(a) All items will be requisitioned through the respective Army, Navy, Air Force, or AEC contractor supply points or agencies.

(b) Requisitions on military supply points will be on the following basis:

1. 120 day ordering and shipping time.

2. 30 day consumption period.

3. 30 day reserve.

(c) AEC Contractor requisitions - as appropriate.

Logistics
CJTF SEVEN No. 2-54

c. Class III:

(1) Supply Point - NSC, Pearl Harbor, T.H.

(2) Requirements for petroleum, oils, and lubricants (POL) for all activities on the ENIWETOK ATOLL will be assembled by the [redacted] accountable officer and submitted to COMSERVPAC per CINCPAC serial 163 of 14 May 1953.

(3) Accountability for all POL property on ENIWETOK ISLAND will be maintained by the Commander, [redacted]

(4) Financial accounting, records, or reports required for class 06A POL under Air Force stock fund procedures will be the responsibility of the Commander, [redacted]

(5) Operation of facilities:

(a) The POL tank farm on ENIWETOK ISLAND will be operated by [redacted]

(b) The POL tank farm on PARRY ISLAND is operated by the AEC contractor.

d. Class V:

(1) Requisitioning - Requisitions for military ammunition, pyrotechnics, and explosives, based on authorized allowances or as specifically approved by Task Force Headquarters, will be submitted direct to respective supply points.

e. Emergency Supply:

(1) Emergency requirements will be submitted as follows:

(a) Army material - to CG USARPAC.

(b) Navy material - to COMSERVPAC (NSC, Pearl Harbor, COMNAVSTA KWAJ, NAS, Barbers Point).

(c) Air Force material - per AFM 67-1.

(d) AEC or its contractors - to respective supply agencies under existing agreements.

(2) Military emergency requirements will be limited to materials which cannot be obtained from normal supply points in time to prevent significant delay in accomplishing essential missions. Such military requisitions will be plainly marked "EMERGENCY" and the operational necessity for the materials fully explained.

f. Property Disposal.

(1) Serviceable military property in excess to foreseeable requirements and repairable military property beyond the repair capabilities of the garrison force will be reported to the respective supply points for disposition instructions.

(2) Salvage and scrap will be disposed of per existing instructions of the owning department or agency.

(3) Destruction of military salvage or scrap material is authorized only when it has been determined to be of no further use on ENIWETOK ATOLL.

4. Evacuation

a. Sick and Injured:

(1) Military personnel, who, in the opinion of the medical authorities cannot be returned to duty within 15 days, normally will be evacuated from the forward area. AEC and AEC contractor personnel are evacuated per provisions of the contracts or employee's agreements as applicable or as determined by the responsible agency or contractor.

(2) Air evacuation facilities will be provided by the Pacific Division, Military Air Transport Service (PACDIVMATS), and will be arranged by coordination with the Commanding Officer, 1453rd Medical Air Evacuation Squadron, Hickam Air Force Base, T.H.

(3) Military personnel and federal civilian employees will be evacuated to the Tripler Army Hospital, OAHU, T.H. Employees of the AEC contractors and other non-federal agencies will be evacuated to civilian hospitals as designated by the contractor or agency.

(4) The return of evacuees to their duty stations will be arranged by the JTF SEVEN Liaison Officer, Hickam AFB, T.H., in coordination with PACDIVMATS and the appropriate hospital authorities.

b. Deceased

(1) Remains of military and AEC personnel will be evacuated to the U.S. Army Mortuary, Tripler Army Hospital, OAHU, T.H., when autopsy is desired, or to the mortuary, U. S. Naval Station, Kwajalein, M.I. when no autopsy is required. Remains of employees of the AEC contractor or other non-federal agencies will be evacuated to civilian mortuaries on OAHU, T.H., as designated by the contractor or agency.

(2) Remains will be prepared and shipped per instructions published by CG USARPAC and PACDIVMATS.

(3) The following information will be furnished in advance to CG USARPAC by TWX in each case, with information to PACDIVMATS:

(a) Military personnel

1. Name, rank, serial number, organization, and service of deceased.

2. Campaign ribbons, decorations, and awards to which deceased is entitled (if service record is incomplete, so state.)

3. Data concerning the flight on which remains will be shipped, including ETA, OAHU, T.H.

(b) Civilian personnel

1. Name of deceased and organization by which employed.

2. Name and address of next of kin.

3. Data concerning flight on which remains will be shipped including ETA, OAHU, T.H.

(4) Territory of Hawaii standard death certificate will be accomplished by the cognizant medical officer in the forward area and forwarded with the remains in each case.

(5) A complete serviceable uniform, except headgear and footwear, will accompany the remains of military personnel.

5. Transportation

a. Sea Transportation

(1) General

(a) Routine ocean shipping for support of the task force will be provided by the following agencies:

1. Personnel and dry cargo space - by the Military Sea Transportation Service (MSTS).

2. Reefer cargo space - by Commander, Western Sea Frontier (COMWESTSEAFRON).

3. Bulk and packaged POL cargo space - by the Commander, Service Force, Pacific Fleet (COMSERVPAC).

(b) Special ships and craft required by the task force will be arranged by Task Force Headquarters, as required.

(2) Requirements for sea transportation will be prepared and submitted per SOP 75-2 and SOP 172-407, JTF SEVEN headquarters.

(3) Ports of Embarkation/Debarkation (CONUS):

(a) Cargo (except ammunition and explosives) - Naval Supply Center, Oakland, California.

(b) Ammunition and explosives - Naval Magazine, Port Chicago, California.

(c) Personnel - San Francisco Port of Embarkation, San Francisco, California.

(4) Areas Served:

(a) Westbound

1. From US to OAHU, T.H.; KWAJALEIN ISLAND, M.I.; BIKINI ATOLL, M.I.; and ENIWETOK ATOLL, M.I.

2. From OAHU, T.H.; to KWAJALEIN ISLAND, M.I.;BIKINI ATOLL, M.I. and ENIWETOK ATOLL.

3. From KWAJALEIN ISLAND, M.I., to ENIWETOK and BIKINI ATOLLS.

(b) Eastbound

1. From ENIWETOK ATOLL, M.I., to BIKINI ATOLL, M.I.; KWAJALEIN ISLAND, M.I.; OAHU, T.H. and U.S.

2. From KWAJALEIN ISLAND, M.I., to OAHU, T.H., and U.S.

3. From OAHU, T.H., to U.S.

(5) Inter-Island Water Transportation (ENIWETOK ATOLL). The AEC contractor operates a boat pool at ENIWETOK ATOLL. This boat pool provides ship-to-shore and inter-island service. CTG 7.2 will operate a small boat pool at ENIWETOK ATOLL for purposes of SAR and security sweeps.

(6) Inter-Atoll Water Transportation (ENIWETOK-BIKINI-WEATHER ISLANDS). Requirements for water transportation for ocean going crafts to support AEC and task force requirements will be submitted to CJTF SEVEN.

b. Air Transportation

(1) General

(a) Air transportation for support of the task force will be provided as follows:

1. Air freight and personnel normally will be transported on regularly scheduled MATS flights.

2. Special Air Missions (SAM) flights will be arranged by JTF SEVEN headquarters, in appropriate cases.

(2) Requirements. Requirements will be prepared and submitted per SOP 76-3 and SOP 172-403, JTF SEVEN headquarters.

(3) Aerial Port of Embarkation/Debarkation (CONUS) - Travis AFB, California.

(4) Areas Served

(a) Westbound

1. From US to ENIWETOK ISLAND, Channel US-40; US to KWAJALEIN ISLAND, Channel US-37; US to HICKAM AFB, T.H., Channel US-39.

2. From HICKAM AFB, T.H., to ENIWETOK ISLAND, Channel 39-40; HICKAM AFB, T.H., to KWAJALEIN ISLAND, Channel 39-37.

3. KWAJALEIN ISLAND to ENIWETOK ISLAND, Channel 37-40.

(b) Eastbound

1. From ENIWETOK ISLAND to US, Channel 40-US; ENIWETOK ISLAND to HICKAM AFB, T.H., Channel 40-39; ENIWETOK ISLAND to KWAJALEIN ISLAND, Channel 40-37.

2. From KWAJALEIN ISLAND to US, Channel 37-US; KWAJALEIN ISLAND to HICKAM AFB, OAHU, T.H., Channel 37-39.

3. From HICKAM AFB, T.H. to US, Channel 39-US.

(5) Clearance

(a) All air shipments must meet the eligibility requirements specified by pertinent Army, Navy, and Air Force publications.

(b) Traffic scheduled for movement from the CONUS must be cleared with Task Force Headquarters or the Task Force Liaison Officer at Travis AFB, California, per MATS operating procedures, prior to shipment to the aerial port of embarkation.

(c) Air movement designators (AMDs) will be assigned to shipments as follows:

1. JTF SEVEN Headquarters will control or assign air movement designators for traffic over Channels US-40, US-37 and US-39. This function will normally be accomplished by JTF SEVEN Liaison Officer at Travis Air Force Base, California, except on direct requests to JTF SEVEN Headquarters for AMDs by shipper or sponsoring task group.

2. JTF SEVEN Liaison Officer, Hickam AFB, T.H., will assign AMD's for traffic over Channels 39-40, 39-37 and 39-US.

3. The Marshalls Air Transportation Board will assign AMDs for traffic over Channels 37-40, 37-39 and 37-US. During the period when the JTF SEVEN Liaison Office is open at KWAJALEIN, AMDs for these channels will be assigned by the JTF SEVEN Liaison Officer, KWAJALEIN.

4. CTG 7.2 will assign AMDs for traffic over Channels 40-37, 40-39 and 40-US.

5. JTF SEVEN Liaison Officer at Travis AFB, California, may assign AMDs for traffic over Channels US-39, US-37 and US-40 when necessary.

(6) Inter-Island Air Transportation (ENIWETOK ATOLL).

(a) [redacted] will operate liaison aircraft and helicopters for inter-island airlift at ENIWETOK ATOLL.

(7) Inter-Atoll Air Transportation (ENIWETOK-BIKINI-WEATHER ISLANDS). Requirements for air transportation to support AEC and task force requirements will be submitted to CJTF SEVEN.

c. Land Transportation

(1) CTG 7.2 will provide appropriate land transportation services for military elements of the task force on ENIWETOK ISLAND and for security sweeps on other islands of ENIWETOK ATOLL.

(2) The AEC contractor provides land transportation for support of all AEC activities in the forward area.

d. Port Operations (Forward Area)

(1) Commander, Task Group 7.2, is responsible for:

(a) The operation of a port of embarkation/debarkation at ENIWETOK ISLAND for all personnel and cargo moving to or from ENIWETOK ATOLL by water. Vessels will be worked on a no-delay basis commensurate with vessel schedules. This will normally require two shifts covering a

period of 0730 - 2400 hours daily, but may require around-the-clock operation on a particular vessel as determined by CTG 7.2.

(b) The providing of stevedoring labor, assisted by th[redacted] and equipment (except marine craft and craft operators) for loading and unloading of supplies, materials, and equipment at ENIWETOK ATOLL and for all on shore cargo handling on ENIWETOK ISLAND.

(c) The documenting, processing, and embarking of all outbound passengers and cargo.

(d) The debarking, discharging, and processing of all inbound passengers and cargo.

(e) The establishing of appropriate procedures for prompt movement of frustrated cargo.

(f) The submission to JTF SEVEN Headquarters a preembarkation forecast as of 1700 hours local time each Friday, or as otherwise directed.

(2) The AEC through its contractor provides:

(a) The supervision and operation of boats, tugs, and barges for loading and unloading supplies, materials, and equipment and for movement of personnel to and from ships at ENIWETOK ATOLL.

(b) All on shore cargo handling on ENIWETOK ATOLL except ENIWETOK ISLAND.

6. Liaison Offices

a. Task Force Liaison Offices are located at Naval Supply Center; Oakland, California, Travis AFB, California, and Hickam AFB, OAHU, T. H. These offices will function as Movement Control Agencies (JTF MCA) per CINCPAC serial 020 of 1 April 1952. In addition, a JTF MCA will be operated at KWAJALEIN when warranted by task force activities at that location.

b. Task Force Liaison Officers are local representatives of the Task Force Commander in all matters concerning the Task Force and are directly responsible to the Assistant Chief of Staff, J-4 (Logistics).

(1) Liaison Officer, Hickam AFB, T.H., will coordinate task force activities with JTF SEVEN, CINCPAC, USARPAC, COMSERVPAC, COMHAWSEAFRON, COMPACDIVLANTS, and COMSTSMIDPACSUBAREA, as appropriate.

(2) Liaison Officer, Naval Supply Center, Oakland, California, will coordinate task force activities with SFPE, MSC, OAKLAND, MAS, ALAMEDA, COMWESTSEAFRON, COMSTSPACAREA, OAKLAND ARMY BASE, CALIFORNIA, and such other agencies as may be necessary.

(3) Liaison Officer, Travis AFB, California, will coordinate the airlift of task force cargo and personnel through that base with SFPE, OAKLAND ARMY BASE, and such other agencies as may be necessary.

c. Liaison Officers will expedite the movement of task force personnel and cargo to and from the forward area. Where necessary, blocks of air movement designators will be furnished to liaison officers of the various task groups to expedite the movement of emergency cargo. MDs will be issued liaison officers at aerial ports only when passengers have reported for overseas shipment.

d. Liaison Officers located at Travis AFB and Hickam AFB, and Kwajalein Island (when open) will manage the air movement of the tonnage allocated to JTF SEVEN over channels under their purview, in coordination with the appropriate Air Transportation Board.

7. Maintenance

a. Fixed Plant and Utilities

(1) The AEC maintains the fixed plant and utility system on all islands of ENIWETOK ATOLL.

(2) The AEC through its contractor operates the fixed plant and utility systems other than Communications systems, POL farm, and airfield facilities on Eniwetok Island.

b. Military Equipment. The maintenance of military equipment will be governed by the appropriate provisions of SOP 65-1, JTF SEVEN Headquarters.

8. Storage

a. Serviceable military property, which is not required for support of the garrison, and has not been approved for shipment out of the forward area, will be properly preserved and placed in standby storage.

b. Serviceable AEC Contractor property - stored as directed by AEC Contractor.

c. To the extent feasible, material in inactive storage will be rotated with material in use.

d. Sensitive military material such as ammunition, explosives, and inflammable materials will be stored per current directives of the cognizant services and the AEC contractor.

9. Property Control

a. All military property on ENIWETOK ATOLL will be carried in an appropriate property account (Army, Navy, or Air Force). Task Force owned property will be accounted for in such a manner as to permit its ready segregation from other types of military property.

b. Each military task group commander will take necessary steps to insure strict supply discipline within his command and full compliance with the respective service accounting procedures.

c. Loan of Military Property

(1) All non-expendable military property, except aircraft, on ENIWETOK ATOLL is available for loan to AEC activities or between the respective services.

(2) Loans of equipment or property will be controlled by provisions as applicable to the loaning service.

(3) Technical property will be loaned only to those activities which have qualified operators and custodians.

d. Marking of Military Property. All military property will be marked per existing instructions of the respective service. Task Force owned property will be marked in such a manner as to distinguish it from other military property.

10. Procedural Details. Details in connection with task force logistical operations will continue to be published by JTF SEVEN Headquarters in appropriate SOPs.

11. Application. The provisions of this annex apply only in the forward area.

C. B. NIELSEN
Rear Admiral, USN
Commander

OFFICIAL:

M. H. COX
CAPT, SC, USN
Asst Chief of Staff, J-4

HEADQUARTERS, Joint Task Force SEVEN
APO 187 (HOW), c/o Postmaster
San Francisco, California
7 May 1954

Annex D to CJTF SEVEN Operation Order No. 2-54

COMMUNICATIONS

1. General. This annex prescribes the policies and responsibilities for installation, maintenance and operation of communications-electronics facilities remaining in the Pacific Proving Grounds (PPG) during the interim period following Operation CASTLE.

2. Mission. To provide communications-electronics support for Task Force elements remaining in the Pacific Proving Grounds during the interim period following Operation CASTLE. Such support will provide maximum security, reliability, accuracy, speed of service and flexibility consistent with existing technical and logistical capabilities.

3. Guiding Principles

a. No further full scale tests will be conducted in the Pacific Proving Grounds within one year of completion of Operation CASTLE.

b. Electrically transmitted messages will be largely unclassified consisting primarily of logistical and administrative information.

c. All classified traffic will be encrypted off-line, in a machine or tape system, prior to transmission.

d. Military communications operations will be limited to the ENIWETOK ATOLL area.

e. The AEC will maintain and operate facilities on PARRY Island.

f. Major emphasis will be placed on maintenance, repair and rehabilitation of all communications equipment and systems.

g. Interim COI's, published and distributed by Hqs., JTF SEVEN, will supplement instructions contained in this order.

h. The use of personal names on voice radio circuits is authorized.

i. Radioteletype facilities (message service) will be used in lieu of insecure voice radio whenever practical.

j. Military type communications or electronic equipment on loan to the AEC contractor requiring maintenance beyond the capabilities of the AEC contractor repair facilities will be turned in to the Army Task Group for replacement or repair.

4. Assignment of Responsibilities

a. Task Group 7.2

(1) Provide communications support and coordinate communications requirements for all elements of the Garrison Force. Approval of CJTF SEVEN is necessary for those requirements involving requisition of fixed plant communications equipment.

(2) Operate and maintain relay center, ENIWETOK, with the following terminations:

(a) ENIWETOK-USARPAC Duplex RATT (1).

(b) ENIWETOK-Los Alamos, Duplex RATT (1).

(c) ENIWETOK-KWAJALEIN, MUX RATT (1). AACS Squadron, ENIWETOK, will provide, operate and maintain terminal transmitting receiving and multiplex equipment and will allocate one channel to the Joint Relay Center, ENIWETOK.

(d) Local teletype service to AACS Squadron, ENIWETOK.

(e) Local teletype service to TG 7.2 and TG 7.5 (H&N).

(3) Operate and maintain communication center for TG 7.2 on ENIWETOK Island.

(4) Provide crypto guard facilities for TG 7.2, AACS Squadron, ENIWETOK, and TG 7.5 (P&N), PARRY Island.

(5) Operate and maintain local ship-shore HF voice and CW circuits.

(6) Provide and maintain military tactical radio equipment required by the garrison force.

(7) Operate and maintain the ENIWETOK Island telephone plant to include periodic tests, maintenance and rehabilitation of cable plant.

(8) Conduct scheduled inspection and maintenance of all motion picture projector equipment in use or storage at the Pacific Proving Grounds.

(9) Provide scheduled maintenance for Armed Forces Radio Station WXLE.

(10) Procure, store and issue military communications-electronics equipment required by the Garrison Force. Maintain an adequate stock level of spare parts for all items.

(11) Perform scheduled inspection and maintenance of communications-electronics equipment placed in dehumidified storage.

(12) Periodically monitor TG 7.2 communications for security violations and procedural errors.

(13) Operate a battery charging plant.

(14) Provide and/or operate such other communications-electronics equipment or facilities, the operation or maintenance of which are normally considered a responsibility of the Signal Corps which are within the capabilities of personnel and equipment available.

(15) Provide, from interim equipment stock, equipment required by TG 7.5 for monitoring their own communications facilities.

[redacted]

(1) Operate and maintain communications to include weather, air-ground, point to point radio circuits, radio aids to navigation and airport control facilities.

(2) Provide and maintain one channel of the ENIWETOK-KWAJALEIN MUX circuit to TG 7.2 with termination in ENIWETOK Relay Center (UHPJ).

(3) Provide maintenance support for electronics equipment aboard AVR when requested by ENIWETOK Navy Detachment.

(4) Operate communication center (less code room) at ENIWETOK with full duplex landline teletype circuit to ENIWETOK Relay Center (UHPJ).

(5) Procure, store and issue supplies and equipment required for operation and maintenance of AACS communications-electronics facilities.

(6) Periodically monitor local AACS communications for security violations and procedural errors and take any corrective action that may be considered necessary.

c. Task Group 7.5

(1) Operate and maintain all inside and outside telephone plant facilities at the Pacific Proving Ground except those on ENIWETOK Island.

(2) Operate and maintain TG 7.5 boat pool and other communications-electronics facilities required for intra TG 7.5 operation during interim period.

(3) Maintain all inter-island and buoy cable systems.

(4) Operate and maintain separate TG 7.5 voice and radio-teletype facility between PARRY Island and BIKINI Atoll as required. This facility is for UNCLASSIFIED conversations and traffic only.

(5) Operate motion picture facilities at PARRY Island.

(6) Prepare and distribute a consolidated atoll telephone directory in accordance with JTF SEVEN COI 40-1 (I).

(7) Provide, operate and maintain a TG 7.5 Communications Center on PARRY Island with full duplex teletype circuit to ENIWETOK Relay Center (UHPJ).

(8) Periodically monitor TG 7.5 communications for security violations and procedural errors.

d. Task Groups Remaining in the Pacific Proving Grounds

Process all requests for frequencies, call signs, routing indicators, code words and address groups through Hqs, JTF SEVEN. Report interference problems promptly to Hq, JTF SEVEN.

Communications
CJTF SEVEN No. 2-54

e. Task Groups and Indcpendent Units Remaining in the Facific Proving Grounds Area

Submit telephone directory and subsequent changes thereto in accordance with JTF SEVEN Interim COI 40-1 (I).

5. Administrative and Logistical Matters

a. CJTF SEVEN Administrative Order 2-53 applies.

b. Logistical matters pertaining to the procurement of equipment and supplies to meet special or emergency requirements and which cannot be obtained through normal supply channels in time to prevent significant delay in accomplishing essential missions may be referred direct to Headquarters, JTF SEVEN.

c. Replacement and maintenance parts for tactical Signal Corps equipment in use by the AEC contractor (H&N) will be requisitioned from CTG 7.2.

F. W. CLARKSON
Major General, USA
Commander

OFFICIAL:

Francis C Bowen

FRANCIS C. BOWEN
Colonel, U.S. Army
Assistant Chief of Staff, J-5